2023-1798, 2023-1804, 2023-1870, 2023-1941

United States Court of Appeals for the Federal Circuit

SAFE DRIVING TECHNOLOGIES LLC,

Appellant,

v.

FORD MOTOR COMPANY,

Cross-Appellant,

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2021-01341, IPR2021-01446, IPR2022-00086.

APPELLANT SAFE DRIVING TECHNOLOGIES LLC'S OPENING BRIEF

Dated: August 21, 2023

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CERTIFICATE OF INTEREST

Counsel for Appellant Safe Driving Technologies, LLC certifies the following:

1. The full name of every party or amicus curiae represented by counsel is: Safe Driving Technology, LLC

2. The name of the real party in interest represented by counsel is: Safe Driving Technology, LLC.

3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the party or amicus curiae represented by counsel are:

   General Patent Corporation

4. The names of all law firms and the partners or associates that appeared for the party represented by me in the PTAB, or are expected to appear in this Court are:

   Ellenoff Grossman and Schole LLP, Michael Shanahan, and John Stellabotte.

5. The Title and number of any case known to counsel to pending in this or any other court or agency that will directly affect or be directly affected by this court's decision in the pending appeal. *See* Fed. Cir. R. 47.4(a)(5) and 47.S(b). (The parties should attach continuation pages as necessary).

Safe Driving Technologies v. Ford Motor Company, 2023-1804

Safe Driving Technologies v. Ford Motor Company, 2023-1941

Safe Driving Technologies v. Ford Motor Company, 2023-1870

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CASES

I. STATEMENT OF RELATED CASES

Counsel for Appellant, Safe Driving Technologies, LLC ("SDT"), certifies that no other appeal from the same proceedings in the United States Patent and Trademark Office, Patent Trial and Appeal Board, ("PTAB") is or was previously before this Court or another appellate court, whether under the same or a similar title.

The Court designated the following appeals 2023-1798, 2023-1804, 2023-1870, 2023-1941 from the PTAB in Nos. IPR2021-01341, IPR2021-01446, and IPR 2022-0086, as consolidated appeals. Case 23-1798, Dkt. No. 12. The Court's decisions in these consolidated appeals may affect the following district court matter: *Safe Driving Technologies LLC v. Ford Motor Company*, No. 1:21-cv-0064 (D. Del.).

II. STATEMENT OF JURISDICTION

The Board issued its Final Written Decision in in IPR2021-01341 on February 7, 2023 (Appx 1-72); IPR2021-01446 on March 10, 2023 (Appx1191-1275); and IPR2022-0086 on May 15, 2023 (Appx 2790-2878). The Board had subject matter jurisdiction over the underlying proceedings under 35 U.S.C. §§ 6, 318(a). SDT timely filed Notices of Appeal. IPR Petitioner Ford Motor Company ("Ford") cross-appealed in IPR2021-01446.

On June 1, 2023, the Court consolidated the appeals and cross-appeal, Dkt. Nos. 2023-1798, 2023-1804, 2023-1670, and 2023-1941. This Court has jurisdiction over all three appeals and the cross-appeal under 28 U.S.C. § 1295(a)(4)(A) and 35 U.S.C. §§ 141, 319.

III. PRELIMINARY STATEMENT

This case involves consolidated appeals from three *inter partes* review (IPR) proceedings, challenging 1) claims 1-4 and 7-10 of U.S. Patent No. 9,713,994 ("the '994 patent") (Appx2); 2) claims 1-4, 6, 10, 12-17, 19-21 and 31 of U.S. Patent No. 9,047,170 ("the '170 patent")(Appx 1192); and claims 1, 2, 6, 11-14, 18-20, 23-24, 43-44, 47, 63, 79, 97, 99 and 113 of U.S. Patent No. 8,301,108 ("the '108 patent") (Appx2878). SDT owns all three patents (collectively the "SDT Patents").

In the first IPR, the Board held claims 1-4, 7-10 of the '994 patent (all challenged claims) unpatentable. Appx 70. In the second IPR, the Board held claims 1-4, 6, 10, 12-14,16,17, 19-21, and 31 of the '170 patent unpatentable, but held that claim 15 was not unpatentable. Appx1273-74. Ford cross-appealed the finding that claim 15 is not unpatentable. In the third IPR, the Board held that claims 1, 2, 6, 11-14, 18-20, 23-24, 43-44, 47, 63, 79, 97, 99,

and 113 of the ‘108 patent (all challenged claims) were unpatentable. Appx2878.

SDT’s appeal focuses on the Board’s improper construction of certain claim elements that either impermissibly import limitations into the claims, conflict with the intrinsic record, rely solely on extrinsic evidence, fail to consider the actual claim language itself, or rely on “facts” not in evidence.

Claims 1-21 of the ‘170 patent (Appx 1294-1295(22:55-24:17) and all claims of the ‘108 patent (Appx 2896-2900(22:42-30:29) require providing “*to the driver*” an “*output*,” with that *same* output being provided in a first “*original format*” and the *same* output then being provided in a second “*different format*” other than the “*original format.”* This is clear from the use of antecedent basis in these claims that they require providing “*the*” or “*said” “at least one output”* to the driver in both the *original* and *different formats*.” Claim 10 of the ‘994 patent (Appx93(24:33-59) also recites the *same output* in a second “*different format*” other than the “*original format*” and should be treated the same as the claims above for reasons below.

The Board failed to address these claim construction arguments that SDT specifically made that these claims require the *same output* for both the *original* and *different* formats and found these claims unpatentable (based on

U.S. Patent No. 6,311,078 "Hardouin" alone), concluding that generating an alerting signal is the "*original format"* and then *not* generating an alerting signal qualifies as the "*different format*" without analyzing the source of the "*different format*" output. This constitutes reversible error because under the correct claim construction, it is the "*at least one output"* that is the basis for both the "*original format"* and *"different format"* as recited in these claims. Appx61-66; 1246-1255; 2835-2848. In Hardouin, however, the two outputs are from a completely different and unrelated origin – not the *same* output as these claims require. Under the correct claim construction, the Board's unpatentability determination must be reversed.

Claim 31 of the '170 patent specifies "*changing*" an "*original input interface*" accessible within a vehicle to an "*alternative*" and "*different input interface*" that is also "*accessible within the vehicle*." Appx1270(25:4-18) The Board's claim construction that the claimed "*alternative input interface*" need not be at least partially functional is incorrect because that renders the "*alternative interface*" <u>inaccessible</u> from within the vehicle which conflicts with the required accessibility of claim 31. Appx1255-1260. At least some functionality is necessary to make the alternative interface accessible to the driver– otherwise it is inaccessible.

In applying its construction, the Board further opined that the alternative interface can be merely a non-functional keypad. This is also an error, because, to the extent that just the physical keypad itself -- without any functionality -- is identified as the interface, it is immutable and therefore cannot qualify as both the "*original*" and the "*changed*" "*alternative*" interface. Moreover, it is well understood that a computer interface is a portal between man and machine and when the interface is not functional, it ceases to qualify as an interface because there can be no interaction between the two.

Significantly, Hardouin merely describes the presence of a keypad 105 with no further discussion of it. Appx67 (1:64-65),870(FIG.1). Therefore, because the non-functional keypad is not "*accessible*" as required by the claim itself Appx1270(25:4-18), the Board's unpatentability determination based on Hardouin alone must be reversed.

The term "format" appears in all 154 claims of the SDT Patents except claim 31 of the '170 patent. Appx 92-93(22:42-59), 1294-96 (22:55-25:18), 2896-2900(22:42-30:29). Given its importance to the invention, SDT provided a specific plain and ordinary meaning definition of the term. Ford chose not to provide a competing definition. The Board also chose not to

provide a specific definition for this core claim term, and instead merely rejected SDT's proposed definition.

The Board did, however, construe "*different format*" to include the limitation of "muting" a telematic or communication device, based on improperly importing that limitation which appears only in dependent claim 14 in the '170 patent. The Board then used this improper construction as the sole basis for its unpatentability ruling, as "informing" the meaning of the other claims at issue to include this limitation.

This, however, is clear legal error. There is no recognized legal doctrine that permits the importing of limitations from dependent claims into other claims to aid in claim construction. In fact, the opposite is true, namely that the dependent claim limitation is expressly understood *not to be present* in the other claims at issue – requiring the exact opposite conclusion from the one the Board reached. Accordingly, for this reason alone, the Board's unpatentability ruling based on Hardouin should be reversed.

Furthermore, the limited definition of "*different format*" the Board chose to use was based solely on an extrinsic evidence definition of the term "muting" and ignored other more relevant intrinsic evidence. That evidence makes clear that when an alerting signal is not generated, such as described in

Hardouin, it cannot be "muted." Simply put, a signal must exist before it can be modified (*i.e.*, "muted"). But that is not the case in Hardouin. The Board erroneously found that when no alerting signal is generated, the as yet non-existent signal can somehow be "muted," rendering its obviousness determination necessarily incorrect.

Under a correct construction of "*format*," which SDT proposed as "a data structure arranged for the presentation or display of data," the non-generated signal of Hardouin cannot qualify as having a (different) format because it has no associated data structure to be presented or displayed. Indeed, it is nonsensical that the absence of a signal would have a "*format*" because there is simply nothing to be formatted. This is fatal to the Board's unpatentability ruling, which should be reversed.

"Telematic device" appears in all claims of the '994 patent and claims 1-21 and 31 in the '170 patent. Appx 92-93(22:42-59), 1294-96 (22:55-25:18), 2896-2900(22:42-30:29). It does not appear in the '108 patent. *Id.* The Board erred in construing this term because it ignored the definition provided in the specification, ignored the preferred embodiment of the invention which directly supports the specification definition, and relied primarily on a long-outdated extrinsic evidence source in adopting a definition

that conflicts with the specification, and with which both parties' experts disagreed. The Board failed to perform any analysis based on SDT's proposed definition. Thus, under SDT's definition, the Board's obviousness determination should be reversed.

"Providing the driver a signal" appears in claim 10 of the '170 patent. The Board erred by construing this limitation in a manner that ignored that the specification supported for SDT's construction that requires that a signal must be actually supplied and not withdrawn. The Board's construction that the absence of a signal qualifies as somehow "providing a signal" also conflicts with the plain and ordinary meaning of this common term and thus the Board's obviousness determination should be reversed.

"Downloading" appears in claim 20 of the '170 patent. Appx 1295(20:13-15). The Board erred in construing "downloading" in a manner that ignores both the specification and the claim language itself that requires downloading certain optional file types such as an "operating system," or "software" or "new application," all of which require a request rather than an automated transfer. The Board admits it did not consider these requirements in rendering its ruling, which provides specific support for SDT's construction and requires reversal of its obviousness determination.

The Board further erred in basing its obviousness determination on a factual finding that mobile phone Internet browsers existed prior to 2002 and more specifically prior to the filing date of Hardouin (November 21, 1998). There is no evidence whatsoever in the record supporting this date, nor does Petitioner Ford take this position in its papers. It appears the Board impermissibly made this new argument on Ford's behalf in its decision, which is not supported by substantial evidence. Accordingly, the obviousness determination should be reversed.

IV. STATEMENT OF THE ISSUES

1. Did the Board err in construing "different format" in U.S. Patent 9,713,994 Claim 10 (element 10.3) and as recited in claim 1 of the '170 patent and dependent claims (3, 4, 16, 17, 19 and 21) and as recited claim 1 and dependent claims 2, 12, 19-20,23-24, 97 and 99 of the '108 patent as including "muting" from claim 14 of the U.S. Patent 9,047,170?

2. Under a correct construction of "different format" in U.S. Patent 9,713,994 Claim 10 (element 10.3) and as recited in claim 1 of the '170 patent and dependent claims (3, 4, 16, 17, 19 and 21) and as recited claim 1 and dependent claims 2, 12, 19-20,23-24, 97 and 99 of the '108 patent that does not include "muting," should the Board's determination of obviousness based

solely on Hardouin (United States Patent No. 6,311,078), be reversed for lack of substantial evidence?

3. Did the Board err in construing "different format" in U.S. Patent 9,713,994 Claim 10 (element 10.3) and as recited in claim 1 of the '170 patent and dependent claims (3, 4, 16, 17, 19 and 21) and as recited claim 1 and dependent claims 2, 12, 19-20,23-24, 97 and 99 of the '108 patent as not being based on the same "at least one output" as "said at least one application output… in the original format" as required by the antecedent basis in the claim that requires both "said at least one application output… in the original format" and "said at least one output to the driver in a different format" are based on the same "at least one output"?

4. Under a correct construction of "different format" in U.S. Patent 9,713,994 Claim 10 (element 10.3), consistent with the claim's use of antecedent basis, should the Board's determination of obviousness based solely on Hardouin (United States Patent No. 6,311,078), be reversed for lack of substantial evidence?

5. Is there substantial evidence supporting the Board's obviousness determination based solely on Hardouin (United States Patent No. 6,311,078) even under the Board's erroneous construction of "different format" as recited

in claim 1 of the ‘170 patent and dependent claims (3, 4, 16, 17,19 and 21) as including “muting” from claim 14 of the U.S. Patent 9,047,170?

6. Under a correct construction of “different format” as recited in claim 1 of the ‘170 patent and dependent claims (3,4,16,17,19 and 21) that does not include “muting,”, should the Board’s determination of obviousness based solely on Hardouin (United States Patent No. 6,311,078), be reversed for lack of substantial evidence?

7. Under a correct construction of different format” as recited in claim 1 of the ‘170 patent and dependent claims (3, 4, 16, 17, 19 and 21), consistent with the use of antecedent basis in those claims, should the Board’s determination of obviousness based solely on Hardouin (United States Patent No. 6,311,078), be reversed for lack of substantial evidence?

8. Did the Board err in construing “telematic device” in U.S. Patent 9,713,994 Claims 1-10 and Claims 1-21 and 31 in U.S. Patent 9,047,170 as a “telecommunications and informatics device” rather than “a central multifunction device such as a computer, PDA and the like that integrates together at least the features of information, communication, computing, and entertainment technologies” (SDT’s definition)?

9. Under a correct construction of "different format" as recited claim 1 and dependent claims 2, 12, 19-20,23-24, 97 and 99 of the '108 patent that does not include "muting,", should the Board's determination of obviousness based solely on Hardouin (United States Patent No. 6,311,078, be reversed for lack of substantial evidence?

10. Under a correct construction of "different format" as recited claim 1 and dependent claims 2, 12, 19-20, 23-24, 97 and 99 of the '108 patent, consistent with the claim's use of antecedent basis, should the Board's determination of obviousness based solely on Hardouin (United States Patent No. 6,311,078), be reversed for lack of substantial evidence?

11. Did the Board err in construing limitations in claim 31 requiring "changing" an "original input interface" of a telematic device "accessible from within the vehicle" to an "alternative" input interface "different than the original interface" to allow it to cover the "same interface," where the "original input interface" is functional and "alternative input interface" is not required to be least partially functional?

12. Under a correct construction of limitations in claim 31 requiring different interfaces, where both the "original input interface" and "alternative input interface" are required to be least partially functional, should the Board's

determination of obviousness based solely on Hardouin (United States Patent No. 6,311,078), be reversed for lack of substantial evidence?

13. Did the Board err in construing limitations in claim 31 requiring an "alternative interface" of a telematic device to be "accessible from within the vehicle" where the "alternative input interface" is not required to be least partially functional?

14. Did the Board err in construing "telematic device" in U.S. Patent 9,713,994 Claims 1-10 and Claims 1-21 and 31 in U.S. Patent 9,047,170 as a "telecommunications and informatics device" rather than "a central multifunction device such as a computer, PDA and the like that integrates together at least the features of information, communication, computing, and entertainment technologies" (SDT's definition)?

15. Did the Board err in construing "telematic device" in U.S. Patents 9,713,994 Claims 1-10 and Claims 1-21 and 31 in U.S. Patent 9,047,170 as a "telecommunications and informatics device" to exclude Internet browsers and email where substantial evidence does not support the Board's finding?

16. Did the Board mistakenly hold that Hardouin (U.S. Patent 6,311,078) renders obvious Claim 10 of U.S. Patent 9,713,994 where

substantial evidence does not support a finding that Hardouin discloses or renders obvious "telematic device" as defined by SDT.

17. Did the Board mistakenly determine that mobile phone Internet browsers were available prior to the priority of date of Hardouin (U.S. Patent 6,311,078) November 20, 1998, where substantial evidence does not support such a finding.

18. Did the Board err in construing "providing the driver a signal" in Claim 10 of U.S. Patent 9,047,170 as "providing the driver with an audible, visual, or tactile indicator" rather than SDT's construction of "providing a signal that actuates or (puts into action) an audio or visual indicator" where substantial evidence does not support such a finding.

19. Did the Board err in construing "downloading" in Claim 20 of U.S. Patent 9,047,170 as "transmitting from a central computer to a remote computer" rather than SDT's construction of "receiving computer-based information based on a request"?

V. STATEMENT OF THE CASE

A. Overview Of The SDT Patents

The SDT Patents all share the same specification and arose from inventor Mohammad Naboulsi's lifelong passion for vehicle safety

technology. Mr. Naboulsi, a first-generation Lebanese immigrant and shareholder and principal of SDT, filed two provisional patent applications in 2001 and 2002 respectively, to which the patents at issue claim priority. Appx73-93 (1:7-17); 1276-1296 (1:1-14); 2879-2900 (1:3-12); Appx 3922-3926 (¶3). Mr. Naboulsi exhibited his inventions in various automotive shows and regulatory sessions throughout the U.S., including the U.S. Department of Transportation in 2009 which automotive industry representatives, including representatives from Ford, attended. *Id*. (¶4).

In March 2003, Ford hired Mr. Naboulsi to work in its Safety Office. *Id*.(¶ 5). Prior to being hired, Mr. Naboulsi disclosed to Ford his provisional patent applications relating to driver safety. *Id*. (¶6). In 2004, Ford asked him to demonstrate his inventions to certain Ford executives and researchers at Ford's Advanced Design Center in Michigan. *Id*. (¶7). After the demonstration, Ford's in-house IP personnel inquired about his patent applications and Mr. Naboulsi provided Ford with licensing terms. *Id*. (¶¶8 and 9).

Ford did not accept Mr. Naboulsi's licensing terms and then required him to waive the rights to his patents to maintain his employment. He refused, and Ford terminated him in December 2004, officially for

"conflict of interest," which Naboulsi understood to be "because he refused to assign" his patent applications to Ford. (*Id*. ¶¶ 7-10).

In 2010, Mr. Naboulsi received the prestigious MIT-SAE's innovator of the year award for the inventions disclosed in his patent applications. *Id*. (¶ 13).

1. The SDT Patents

The SDT patents relate to driver safety and the monitoring and managing of interface outputs through selective filtering and/or reduction of distracting events from the driving environment that may compromise or otherwise diminish a vehicle operator's ability to safely operate the vehicle. Unmanaged use of telematics in general, such as "infotainment" systems now commonly found in passenger vehicles, tends to increase the possibility of an accident or other unsafe condition because such use not only diverts the driver's attention from driving, but also generally requires the use of at least one of the driver's hands and frequently distracts the driver's eyes from both the road and traffic.

The SDT Patents provide an integrated multifunction telematic system and methods for mitigating or minimizing such risks by monitoring for potentially distracting events and selectively filtering or otherwise

modifying system operations in a responsive and adaptive manner based on the distraction level determined or calculated by the system to improve driver safety. This is generally illustrated in FIGs.1 and 4 of the SDT Patents as shown below. Appx75,77,1279,1281,2882,2884.

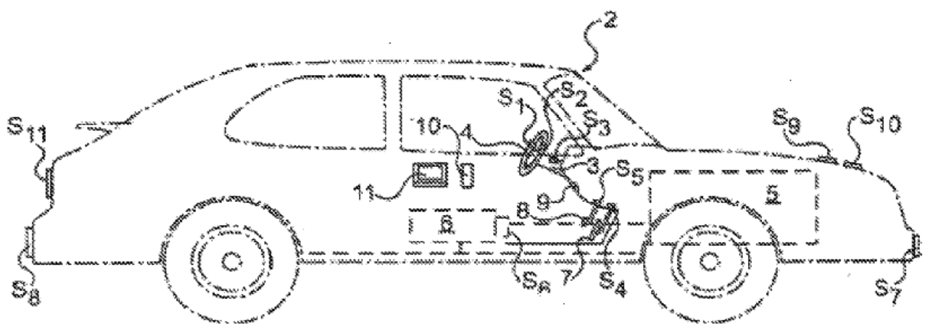


Figure 1

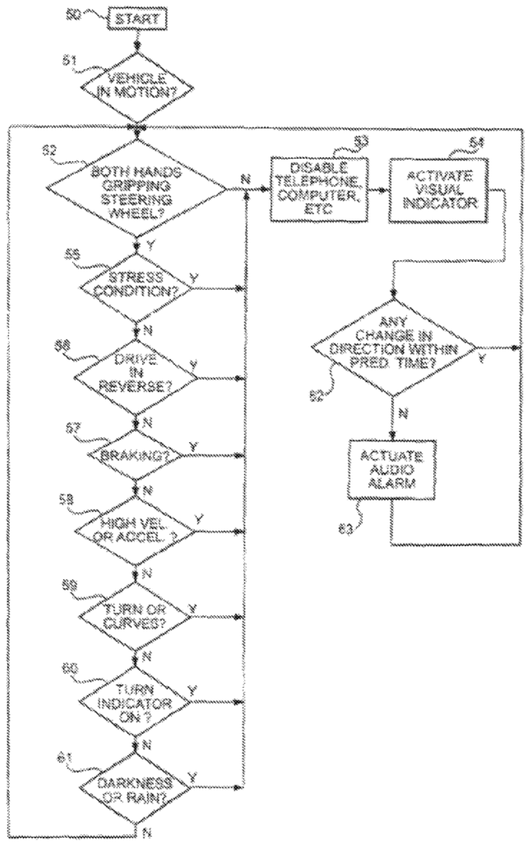


Figure 4

In accordance with aspects of the invention, the telematics system may include certain telematic equipment such as sensors labelled S1- S11 in vehicle 2 of FIGS. 1 and 3, that monitor certain operational characteristics of the vehicle for potentially distracting events as shown in FIGs. 4-5. Appx77-79, 1281-83, 2884-2885. This is generally illustrated in FIG. 4 as described below.

The term *telematics* is a general term used to refer to the collection of electronic devices connected within the telematics system generally

shown and described in FIGS. 1 and 3-5 of the SDT Patents, which would include CD and DVD players, a radio, various sensors and a navigation system and the like.

The term "*telematic device*," however, has a specific meaning set forth in the specification that makes clear that it is necessarily a multifunction device such a cellphone, PDA, computer or the like that has Internet access for browsing the Web and sending emails or other similar electronic communications. *See, e.g.*, Appx1285(3:29-34), 1287(17:17-18). Although all telematic devices are generally "telematics," the opposite is not true. Telematics such as navigation systems and sensors, radios, *etc*. are *not* telematic devices as defined in the SDT Patents.

In operation at block 51 of FIG. 4, after the vehicle is in motion, the sensors shown in FIGs. 1 and 3 begin to monitor the conditions illustrated in the flowchart of FIG. 4. This includes stress conditions 55, drive in reverse 56, braking 57, high velocity or acceleration 58, turn or curves 59, turn indicator ON 60, and darkness or rain sensor 61. If one or more of these conditions is outside a predetermined threshold associated with these conditions, the output of the telematic device may be modified to be more restrictive based on the distraction level assessed. See generally, for

example, FIGs. 3- 5 and the specification Appx76-79, 1280-83, 2883-2885, 2894 (17:56-58),(17:66 - Col. 18:3), 2895(20:18-26),2892(14:26-39).

FIG. 3 illustrates a microprocessor 20, with blocks 21-33 indicating inputs and blocks 41-45 indicating outputs. In a preferred embodiment, microprocessor 20, sometimes referred to as a controller[1], may be a microprocessor that resides on a telematic device[2] and the safety and control system may reside on the telematic device[3].

[1] Appx92(21:10), 1294(21:24-25), .
[2] ‘170 POR at 20; Ex. 2027 ¶52; ‘994 claim 3 (col. 23:27-30).
[3] ‘994 claim 10 preamble.

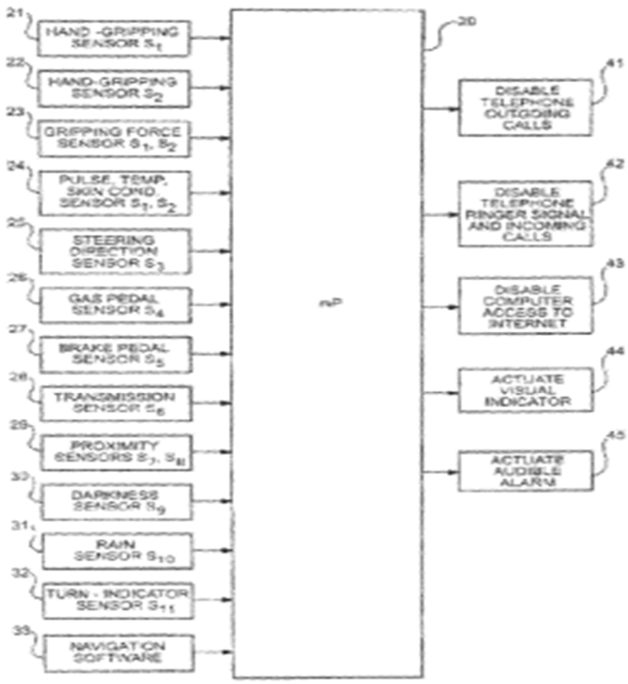


Figure 3

In operation, the invention shown in FIG. 3 may operate as follows:

The outputs from microprocessor 20 include control signals as shown by the following blocks: block 41, effective to disable the telephone or other telematics from making outgoing calls; block 42, effective to disable the telephone or other telematics from receiving incoming calls and from actuating the ringing signal; block 43, effective to disable the computer, if provided, from accessing the Internet to make or receive e-mail, faxes, etc. or to disable any other signal to be otherwise communicated to the driver; block 44, effective to actuate a visual indicator viewable by the driver; and block 45, effective to actuate an audible alarm.

These blocks are representative of a wide range of outputs that may be utilized. For example, while block 41 is nominally listed as disabling outgoing telephone calls, the system may disable (via output 41 or some other

> output) all communications or input devices to prevent the driver from inputting or initiating activities or communications from them. In addition to disabling incoming telephone calls, output 42 or some other output can disable the output of any or all input/output devices to prevent communication to the driver of the particular output signals from these devices.

Appx87(12:42-63), 1290(13:14-23),2891-92 (12:53-13:6).

Thus, certain telematic features may be disabled or modified and the system output recast or repackaged to a less distracting version when a certain degree of driver attention is required. *See* FIGs. 5,5A,5B Appx78-79, 1282-83, 2884-2885(19: 4-27),1293(19:24-40),2895(19:10-32).

2. Customization Of Outputs To Reduce Distractions

Various inputs and outputs in the vehicle "may detract differently from the driver's attention and ability to safely control the vehicle." Appx91(20:7-10),1293(20: 25-28),2895(20:11-14). To address this concern, the SDT Patents allow system outputs to be modified to different formats based on user preferences to further assist in reducing distractions.

For example, the SDT Patents explain that the disclosed system "preferably permits significant customization of the outputs provided to the driver. The driver can preferably select the type of feedback provided by the system (audible, visual, tactile, *etc.*). The driver can also preferably

customize the voice used in any voice feedback, or the tones, tactile response, or visual display, if any, to reduce distraction and maintain driver concentration and awareness." Appx91(20:43-53),1293(20:60-21:2), '108 patent (20:46-55).

Thus, both the safety concerns described in FIGS. 3-5 of the SDT Patents and the customization of outputs by the user are consistent with and support recitation in the claims of the same outputs being provided in "*original*" and "*different formats*" and "*changing*" "*original*" "*input interfaces*" to "*alternative*" and "*different*" functional "*input interfaces*" as recited in claim 10 of the '994 patent, claim 1(and dependent claims 3, 4, 14, 16, 17, 19, and 21) and 31 of the '170 patent(Appx1294-96), and claim 1 and dependent claims 2 and 12 of the '108 patent. Appx2896.

3. The Original Format and Different Format Originate From The Same Output, And An Output Indicator Indicates When Outputs Are Suppressed.

Claim 10 of the '994 patent specifies a safety and control system residing on a telematic device. Claim 1 of the '170 patent and its dependents specify a method for controlling a telematic device(Appx1294-96), and claim 1 of the '108 patent and its dependents specify a communication device. All of these claims recite the *same at*

least one output in "*a different format*" other than the *original* format. The *same output* is used as a basis for both the "*original format*" and "*different format*" outputs. The "*different format*" is merely an alternate version of the same output signal "rearranged," "repackaged" and/or "recast" into the claimed "different format" that is usually somewhat more restricted or simplified to be less distracting. *See generally* '994 patent, 20:43-53, Appx192-93(20:60-21:2), '108 patent, 20:46-55. Similarly, claim 31 of the '170 patent recites "*changing*" an "*original input interface*" to an "a*lternative*" and "*different*" interface, both of which are based on the same "*input interface*" introduced in the preamble as is clear from the antecedent basis use of "*said input interface*." Appx1296(25:4-18).

An output indicator informs the driver when certain outputs are suppressed or disabled. *See* Appx88(14:14-27), 1290(14:42-54), 2892(14:26-39) (visual indicators are actuated <u>to inform the driver</u> of disabled features). *See also* Appx85 (8:16-27), 1287(7:67- 8:10), 2889(7:59-8:2) (when buzzers and alarms are muted or disabled to provide less distraction, a "different format output" provides visual and/or audio outputs to the driver via the "selected method").

4. The Board Has Mischaracterized The Invention And Certain Facts in the FWDs

a. ’994 FWD

i. Telematics v. Telematic(s) Device

The Board confused the meaning of these two terms at Appx16-19. (‘994The Board correctly cites excerpts from the specification on page 18 of the FWD (second to last bullet point) and page 21 (second bullet point from top) that clearly explain that a *telematic device*, is a multifunction computing device such as cellular telephone, PDA or computer that can send and receive email and has Internet browsing ability. Thus, the Board’s contention that there is no support for SDT’s position is incorrect. *See, e.g.,* Appx17, 21-22.

Telematics, however, is simply a general term used to refer to the collection of electronic devices connected within the system generally shown in FIGS. 1-3 of the SDT Patents, which would include CD and DVD players, a radio, various sensors and a navigation system and the like. *See* Appx18-21. Although a *telematic device* may generally be referred to as (a subset of) “*telematics*” in the system, other telematics are *not telematic devices* unless they are multifunctional computing platforms that can send and receive electronic messages such as email and browse the Internet.

ii. Impermissible Importing Of Dependent Claim Limitations Into Independent Claims.

SDT agrees that claim 14 of the ‘170 patent (Appx1295(23:55-62)) is relevant to construing claim 10 in the ‘994 patent, but its relevance is that the limitation of “muting” relied on by the Board as the sole basis of its unpatentability decision, is necessarily *not present* in independent claim 10 (element 10.3). SDT does not agree that using claim 14 to “inform” the construction of claim 10 justifies impermissibly importing of that limitation into claim 10 as the Board erroneously concluded. Appx65-66.

b. ‘170 FWD

i. Telematics Are Not a Telematic Device

The Board overlooked the definition in the preferred embodiment of the invention at Appx1285(3:29-37) and Appx1292(17:17-18) establishing that a *telematic device*, is a multifunction computing device such as cellular telephone, PDA or computer that can send and receive email and has Internet access for Web browsing (and such telematic devices necessarily have microprocessors to carry out these functions).

ii. Multimedia Output

The Board’s conclusion that the telematic device is construed to have both audio and visual outputs, but not multimedia outputs, is undermined by

the telematic device's ability to browse Internet pages and consume associated content, which, by the 2002 timeframe, would require a multimedia output capability. Appx1211-1212. Thus, The Board's conclusion is incorrect.

iii. Telematic Device Is Not A Safety and Control System.

The Board's conclusion that it is a safety and control system, of which the telematic device is a part of, that has the microprocessor (state machine) and is system that integrates information, communication, computing, and entertainment technologies and not the telematic device itself . This conclusion is incorrect for multiple reasons. Appx1213-1214.

First, the microprocessor and state machine of the safety and control system may reside on the telematic device. See 170 POR at 20; Ex. 2027 ¶52; '994 claim 3 (col. 23:27-30). This is indisputable. Indeed, claim 10 of the '994 patent explicitly *requires* the safety and control system to *reside on* the telematic device. Appx93(24:33-35).

Second, the telematic device *is part of* the safety control system in the vehicle, and therefore, the safety and control system, *through the telematic device*, may integrate information, communication, computing, and entertainment technologies into the vehicle. In this way, telematic devices are indeed *central* to the safety and control system as integrating the various

features as described above. This is perfectly consistent with and is in no way incompatible, problematic or otherwise conflicting with the claims or teachings of specification as the Board suggests.

For example, in *all* the relevant independent claims of the ‘994 and ‘170 patents (Appx 92,1294-96) the only element recited in those claims that have the inputs/outputs (such as those shown in FIG. 3) is the telematic device. To construe these claims otherwise would be impermissibly reading additional limitations into the claims. Claim 10 of the ‘994 specifies a safety and control system *residing on* a telematic device. Appx93(24:33-59). Claim 1 of the ‘994 specifies only a telematic device having an output. Appx92(22:42-67).Likewise, independent claims 1 and 31 of the ‘170 specify a method of controlling the inputs or outputs of a telematic device, such as those shown on the right side of FIG. 3 (the elements left side of FIG. 3 are not telematic devices). Appx1294,1295(22:55-23:6). Therefore, it is the *telematic device* that integrates the features in question into the vehicle. *See* SDT Patents FIGs. 1 and 3, and their associated description. The Board provides no intrinsic record-based explanation why SDT’s position is incorrect.

iv. Output Signals Are Provided To The Driver.

The Board's conclusion with respect to claim 10 that control signals travel "device to device" and then terminate at that device before any signal is provided to the driver is technically incorrect for numerous reasons. *See* Appx1215-1217. First, the specification clearly states that a signal from the microprocessor causes a signal to be provided to (effective to actuate – not effective to remove a signal from) the driver.

Second, requiring the microprocessor to provide a control signal *directly* to the driver is a limitation not found in the claim. It is enough that a signal is provided to the driver, regardless of its origin. The Board has impermissibly added this limitation to the claim to justify its conclusion.

Third, as described above, there is only one telematic device in base independent claim 1, so even with the Board's construction, there is no "device to device" communication and a signal from the microprocessor may indeed be provided to the driver.

5. Hardouin (Ex. 1027)

United States Patent No. 6,311,078 titled "Automatic Shutoff For Wireless Endpoints In Motion" (Hardouin) is prior art to the SDT Patents.

Hardouin's Abstract summarizes its disclosed invention as follows:

> A wireless telephone <u>*does not generate an alerting signal* if the speed at which the wireless telephone is moving exceeds a</u>

> predefined speed when an incoming call is received. If an alerting signal is not generated for an incoming call, the wireless telephone transmits a message back to the calling party informing them that they have contacted the wireless telephone and may leave either a voice or data message. The caller can then either leave a voice message or touch tone in the caller's telephone number. Further, the wireless speed of the wireless telephone exceeds the predefined speed. In addition, if the speed has not been equal or less than the predefined speed for a predefined amount of time, call originations and alerting signals are blocked.

Appx(Abstract) (emphasis added).

Thus, Hardouin describes a simpler solution than the SDT Patents by broadly not generating any alerting signal for an incoming call and inhibiting outgoing calls when the phone exceeds a predefined speed. Appx870(1:10-22, 24-42).

Control unit 101 detects the speed of the phone from a speed transceiver 129 connected to a GPS device, information from the vehicle's speedometer, or other methods. *Id.*(1:57- 2:16), Appx(37-38); Appx1243-1246, Appx2804.

FIG. 1, reproduced below, shows a wireless telephone.

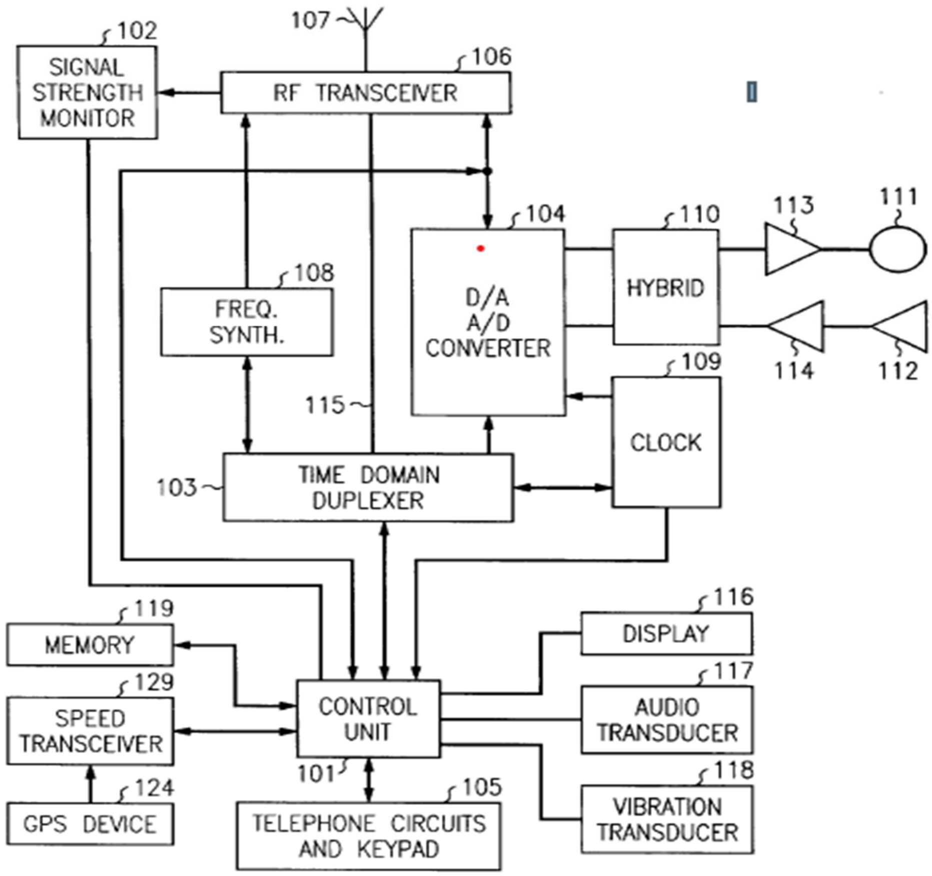


FIG. 1

Elements 116-118 (display, audio transducer, and vibration transducer) and 105 (telephone circuits and keypad) "provide the basic user interface" of the wireless telephone. Appx867(FIG.1), 870(1:64-65).

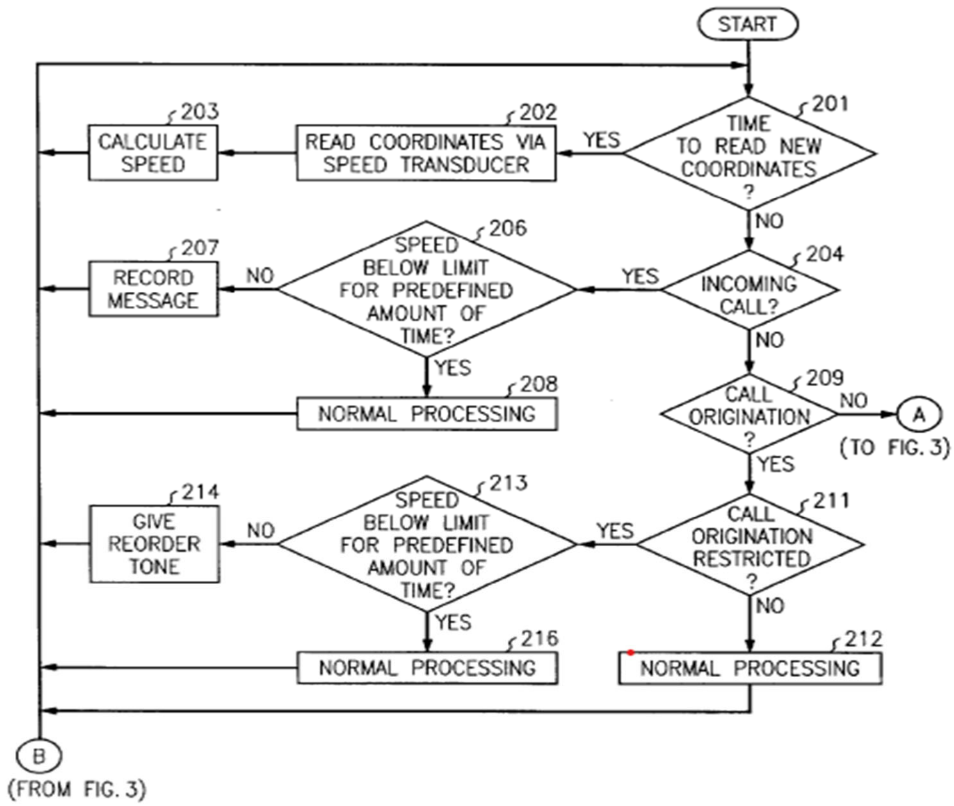
If "control unit 101 determines that the speed is above a predefined amount, it does not alert the user of the wireless telephone via audio transducer 117 the speed is above a predefined speed, it will control the telephone so the telephone does not alert the driver via audio transducer 117 or vibration

transducer 118. Rather, control unit 101 transmits a voice message to the caller that the call is not being answered because the driver is presently driving and prompts the caller to leave a message." Appx870 (2:17-38). The control unit does not let the driver access the message or make a call until below a predefined speed for a predefined time.

The Board understood that Hardouin does not describe user interfaces as providing any output, let alone changing outputs or providing output information in any alternative formats when the wireless telephone exceeds a predefined speed. Appx37-38, 61-66, 1242- 1264, 2804-2808, 2835-2848.

Figure 2(Appx868), reproduced below, illustrates steps that control unit 101 performs:

FIG. 2



At block 204, control unit 101 determines whether an incoming call is being received. In block 206, it determines whether the speed is below a predefined limit for a predefined amount of time. If not, the caller is instructed to leave a message in block 207, otherwise normal call processing occurs in block 208. Appx37-38, 61-66, 1242-1264,2804-2808, 2835-2848 (*citing* Appx 870 (2:41-54, 2:56-65). The word "mute" does not appear in Hardouin. Indeed, there is no description anywhere in Hardouin of the control unit 101 "muting" an alarm when an incoming call is received and the phone exceeds

the predetermined speed limit. Because control unit 101 does not generate an altering signal or alert the user in any way that the call is incoming, there simply is no alarm to be muted.

6. IPR Final Written Decisions

a. In All Institution Decisions the Board Found That Hardouin Did Not Disclose Output In A Different Format.

In each of the three instant IPRs, the Board was unconvinced at institution that Petitioner would prevail with respect to Hardouin because it does not teach a different format. Indeed, in the '108 Institution Decision, the Board opined(emphasis added) :

> Based on the evidence of record, we are not persuaded that Petitioner has shown a reasonable likelihood of prevailing on its obviousness assertion as to claim 1. But, as discussed in Section III.D.2, under Patent Office policy implementing *SAS*, because we have decided to grant institution on Petitioner's first ground, we must do the same for the claims challenged in

'108 ID at 31.

The Board further opined that:

> As discussed above at Section II.E.2, our understanding of Hardouin's disclosure is that its system senses a vehicle's speed and, based on the speed, inhibits the driver's use of a wireless telephone. *See, e.g.*, Ex. 1027, Abstract, 1:25–33, 2:4–38. It provides no related output to the driver, but, instead, informs a caller that the phone cannot be answered and to leave a message. *Id.* It appears that, rather than provide a differently formatted output to the driver (such as muting the phone call), as required by independent claim 1, Hardouin prevents any output at all to the driver (*see*

Appx3117.

The Board made similar remarks in the '994 patent Institution Decision, opining that: "rather than provide a differently formatted output to the driver, as required by claim 10, Hardouin prevents any output at all to the driver . . . ." Appx200-238(emphasis added).

Likewise, in the '170 Institution Decision, the Board also found preliminarily, that Hardouin also does not disclose output in a different format as required in claim 1. Appx 228.

At trial, however, the Board reversed these preliminary findings, even though its understanding of Hardouin *never changed.* The sole reason for this reversal is based on one factor only – reading in the limitation of "muting" from claim 14 of the '170 Patent into "*different format*" as recited in other claims of the SDT Patents as "informing" its meaning. As discussed in more

detail *infra,* reading this limitation into the other claims at issue this is clear legal error.

b. '994 Patent

At trial, Ford reiterated the same argument from its Petition, based on claim 14 of the related '170 patent. Appx192. The Board understood Ford to assert that Hardouin "prevents application output from the telephone to the driver in an original format from the telephone (full phone function and notifications) and provides it in a different format" because, if the system senses a vehicle speed exceeding some predefined speed, the control unit mutes the telephone so as to not alert the user, which is a different output according to the ['994] patent and related ['170 patent]." Appx62.

The Board parroted back but did not address SDT's argument that claim 10 required providing the same output in a different format and that Hardouin did not provide any different formatted output at all based on that construction. The Board agreed with Petitioner's "interpretation of this limitation as including "muting" based on Claim 14 of the '170 patent, and found Hardouin teaches it by disclosing "a controller that mutes a cellular phone as a function of vehicle speed." Appx 62-63. In the context of its patentability analysis, the Board construed "*different format*" to cover

"muting" as not generating an alarm and providing no other output to the driver that the phone was not generating an alarm. *Id*. at 64-66.

The Board mischaracterized the specification as including "disclosure that muting an alarm in response to exceeding a threshold is a form of different output for a device." *Id*. at 62 (citing Appx85(8:21-26),88(14:58). Read in context, it actually makes clear that when the phone is disabled, alarms will be communicated via some other selected method, visual, audio, or both.

c. '170 Patent

At trial, the Board rejected SDT's construction of "telematic device" as a "multifunction device that integrates together the features of information, communication, computing, and entertainment technologies." Appx 1207-1215) (construing telematic device as "a telecommunications and informatics device," a construction neither party proposed). The Board concluded that Hardouin described a telecommunications and informatics device, reasoning it included GPS capabilities and that Ford's expert testified that phones in the 1900s, such as Hardouin's, would have had the ability to access primitive web pages. *Id*. at 1249-1250.

The Board again parroted back but did not address SDT's argument that claim 1 required the *same output* be provided to the driver in a *different format*

than the *original format*. It reasoned claim 14 "informs as to the scope of the output in a different format recited in claim 1" and concluded that "providing said *at least one output to the driver* in the "*format different than the original format*," includes "*muting* the telematic device," where "*muting* " covers not generating an alarm without requiring providing any other notification to the driver that the phone that the phone is not generating alarms. *Id*. at 1253-1254.

The Board found "there is no dispute that inhibiting the wireless telephone's alert signal is muting the telephone," ignoring that it found Hardouin does not generate an alerting signal in the first place (by audio or vibration transducer) that could be muted and that what is inhibited in Hardouin is origination of calls, concluding that it was "persuaded that Hardouin's inhibited alert signal discloses the recited output in a different format." *Id*. at 1255. The Board reasoned that not generating the alert signal does not disable the Hardouin wireless phone." *Id*. at 1254 (citing Appx 870 (2:17-21).

The Board noted claim 31 was similar to claim 1 but recited "an original input interface and changing the input interface based on movement of a telematic device relative to a threshold." *Id*. at 1255-1256. The Board acknowledged the keypad 105 of Hardouin does "not physically change," but

reasoned "changing the functions associated with the keys thereon provides different input interfaces" *Id*. at 1258. The Board relied on testimony from Ford's expert that "disabled keypad buttons" would be an alternative input interface, even though there is no description in the '170 patent of a disabled interface being an alternative input interface. *Id*. at 1258 (citing Appx 2533 ¶¶ 319, 323). The Board rejected the argument that both the original and alternative input interfaces must be at least partially functional, reasoning that "the claim recites an original and alternative input interface, without any further description thereof *Id*. The Board ignored that the claim element recites the input interface must be "accessible," or in other words, capable of being used and at least partially functional.

d. '108 Patent

At trial, the Board once again parroted back but ignored SDT's arguments that claim 1 required the *same output* be provided to the driver in a *different format* than the *original format*, reasoning again that claim 14 of the '170 patent "informs the meaning of" the "different format of claim 1 of the '108 patent." Appx 2140. The Board construed that term, in the context of its patentability analysis, to include "muting" the telematic device, covering

not generating an alarm without providing any notification to the driver that an alarm was not generated. Appx2837-2840.

The Board noted SDT asserted "format" should be construed as "a defined data structure arranged for the presentation or display of data (*i.e.*, its plain and ordinary meaning)" Appx2815, but never specifically addressed SDT's asserted construction of "format."

It rejected as "unhelpful" the parties' arguments on the meaning of "muting" and found the terms mean "deaden, soften or muffle the sound of a thing or person)", "silence a thing or person)", or "suppress the volume of (a loudspeaker) or the output of (an amplifier or other circuit or component)." *Id*. Yet, the construction it in effect adopted and applied covered not generating an alarm in the first place. Appx2840.

The Board also misunderstood that preventing an audible tone from being provided to the driver as recited in claim 8 is different than muting as recited in claim 14 and is the *exact* functionality of Hardouin *the Board* relied on as the basis of its flawed unpatentability analysis. Appx3251-3255.

VI. SUMMARY OF THE ARGUMENT

SDT's appeal focuses on the Board's improper construction of certain claim elements that either impermissibly import limitations into the claims,

conflict with the intrinsic record, rely solely on extrinsic evidence, fail to consider the actual claim language itself, or rely on "facts" not in evidence.

Claims 1-21 of the '170 patent and all of the claims in the '108 patent, require providing "to the driver" an "output," with that same output being provided in a first "original format" and the same output then being provided in a second "different format" other than the "original format. Claim 10 of the '994 patent also recites the same output in a second "different format" other than the "original format" and should be treated the same as the claims above for reasons below.

The Board failed to address these claim construction arguments that require the same output for both the original and different formats and found these claims unpatentable (based on U.S. Patent No. 6,311,078 "Hardouin" alone), concluding that generating an alerting signal is the "original format" and then not generating an alerting signal qualifies as the "different format" without analyzing the source of the "different format" output. This constitutes reversible error because under the correct claim construction, it is the "at least one output" that is the basis for both the "original format" and "different format" as recited in these claims not two outputs are from a completely different and unrelated origin – not the same output as these

claims require. Under the correct claim construction, the Board's as in Hardouin.

Claim 31 of the '170 patent specifies "changing" an "original input interface" accessible within a vehicle to an "alternative" and "different input interface" that is also "accessible within the vehicle." The Board's claim construction that the claimed "alternative input interface" need not be at least partially functional is incorrect because that renders the "alternative interface" inaccessible from within the vehicle which conflicts with the required accessibility of claim 31.

Furthermore, the Board determination that the alternative interface can be merely a non-functional keypad is also legal error, because, to the extent that just the physical keypad itself -- without any functionality -- is identified as the interface, it is immutable and therefore cannot qualify as both the "original" and the "changed" "alternative" interface. Moreover, it is well understood that a computer interface is a portal between man and machine and when the interface is not functional, it ceases to qualify as an interface because there can be no interaction between the two.

The term "format" appears in all 154 claims of the SDT Patents except claim 31 of the '170 patent. Given its importance to the invention,

SDT provided a specific plain and ordinary meaning definition of the term of "a data structure arranged for the presentation or display of data." The Board did not provide a specific definition but did construe "different format" to include the limitation of "muting" a telematic or communication device, based on improperly importing that limitation which appears only in dependent claim 14 in the '170 patent. The Board then used this improper construction as the sole basis for its unpatentability ruling, as "informing" the meaning of the other claims at issue to include this limitation.

This, however, is clear legal error as there is no recognized legal doctrine that permits the importing of limitations from dependent claims into other claims to aid in claim construction.

"Telematic device" appears in all claims of the '994 patent and claims 1-21 and 31 in the '170 patent. It does not appear in the '108 patent. The Board erred in construing this term because it ignored the definition provided in the specification, ignored the preferred embodiment of the invention which directly supports the specification definition, and relied on an extrinsic evidence source in adopting a definition that conflicts with the specification, and with which both parties' experts disagreed.

"Providing the driver a signal" appears in claim 10 of the '170 patent. The Board erred by construing this limitation in a manner that ignored that the specification supported for SDT's construction that requires that a signal must be actually supplied and not withdrawn. The Board's construction that the absence of a signal qualifies as somehow "providing a signal" also conflicts with the plain and ordinary meaning of this common term and thus the Board's obviousness determination should be reversed.

"Downloading" appears in claim 20 of the '170 patent. The Board erred in construing "downloading" in a manner that ignores both the specification and the claim language itself that requires downloading certain optional file types such as an "operating system," or "software" or "new application," all of which require a request rather than an automated transfer. The Board admits it did not consider these requirements in rendering its ruling, which provides specific support for SDT's construction and requires reversal of its obviousness determination.

VII. ARGUMENT

A. Standards of Review

Claim construction is reviewed *de novo*, but underlying factual findings based on extrinsic evidence are reviewed for substantial evidence. *Teva*

*Pharms. USA, Inc. *42 v. Sandoz, Inc.*, 574 U.S. 318, 332-33 (2015); *Arthrex, Inc. v. Smith & Nephew, Inc.*, 935 F.3d 1319, 1329-31 (Fed. Cir. 2019).

Obviousness is a legal question reviewed *de novo*, but any underlying factual findings are reviewed for substantial evidence. *In re Baxter Int'l, Inc.*, 678 F.3d 1357, 1361 (Fed. Cir. 2012); *In re Elsner*, 381 F.3d 1125, 1127 (Fed. Cir. 2004); *see also In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000). Substantial evidence is "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Consol. Edison Co. of N.Y. v. NLRB*, 305 U.S. 197, 229 (1938).

By definition, an independent claim is broader than a claim that depends from it." *Littelfuse, Inc. v. Mersen USA EP Corp.*, 29 F.4th 1376, 1380 (Fed. Cir. 2022). The doctrine of claim differentiation, which is premised on the notion that different claims have different scopes, "normally means that limitations stated in different claims *are not to be read* into the independent claim from which they depend." *Karlin Tech., Inc. v. Surgical Dynamics, Inc.*, 177 F.3d 968, 971–72 (Fed. Cir. 1999) (citing *Transmatic, Inc. v. Gulton Indus., Inc.*, 53 F.3d 1270, 1277 (Fed. Cir. 1995) (emphasis added).

It is impermissible to import limitations from dependent claims into independent claims. "[I]n relying on the dependent claims to inform the

meaning of … claims 1 and 14, the district court effectively imported limitations it saw in dependent claims into the independent claims, contrary to basic claim construction principles. *See, e.g.*, *Baldwin Graphic Sys., Inc. v. Siebert*, 512 F.3d 1338, 1345 (Fed. Cir. 2008).

It is well-settled law that when the intrinsic record establishes the meaning of a claim term, relying on extrinsic evidence to alter that meaning is improper. *See Seabed Geosolutions (US) Inc.*, 8 F.4th 1285, 1290 (Fed. Cir. 2021) (finding PTAB erred when relying on extrinsic evidence to alter a claim construction inconsistent with intrinsic evidence).

A claim construction which excludes a preferred embodiment is rarely, if ever, correct. *On-Line Techs., Inc, v. Bodenseewerk Perkin-Elmer GmbH*, 386 F.3d 1133, 1138 (Fed. Cir. 2004).

B. The Board Erred In Construing Claim 10 of the '994 Patent And Finding Claim 10 Obvious Based On Hardouin

The Board addressed three claim terms in the '994 FWD that it understood the parties "identified a need for construction," including "telematic device" but noted that "[i]f in the context of [its] patentability analysis . . . other claim interpretation [was] necessary," it would be addressed

in the "same portion of the decision in which that analysis occurs and as a part of that analysis." ('994 FWD at 15).

The Board erred in finding claim 10 obvious over Hardouin based on erroneously construing claim 10 in the context of its patentability analysis.

The Board's construction was erroneous for at least *six* reasons.

1. The Board Improperly Imported Limitations from Claim 14 of the '170 Patent.

In determining the meaning of the term "*different format*" in claim 10 of the '994 (element 10.3), the Board considered the meaning of the term "*muting*" from a different patent to analyze the applicability of the Hardouin reference.

In particular, the Board construed "*different format*" to include "*muting*" a telematic or communication device, by improperly importing that limitation from claim 14 in the '170 patent. The Board then used this improper construction as the sole basis for its unpatentability ruling. Specifically, the Board opined that "the "different format" of claim 14 of the '170 patent "informs the meaning of the 'different format' of claim 10 of the '994 patent" and on that basis agreed with Petitioner's position that Hardouin teaches providing the telematic device output in a "different format." *See* Appx at 65.

However, this is legal error. There is no recognized legal doctrine that allows importing limitations from dependent claims into other claims to aid in claim construction. *See e.g., Karlin Tech., Inc. v. Surgical Dynamics, Inc.*, 177 F.3d 968, 971–72 (Fed. Cir. 1999); and *Curtis-Wright Flow Control Corp. v Velan, Inc.*, 438 F.3d 1374, 1380-1381 (Fed. Cir. 2006) (ruling limitations from dependent claims should not be read into other claims).

In fact, the opposite is true in this case, a limitation found in one claim is understood *not to be present* in the other claim at issue – requiring the opposite conclusion from the one the Board reached. Accordingly, for this reason alone, the Board's ruling lacks substantial evidence and should be reversed.

2. The Different Output Format From Same Source

Claim 10 of the '994 patent, recites a software application having "*at least one output*," and further specifies the output in a first "*original format*" and the *same* output in a second "*different format*" other than the "*original format*." This is clear from the use of antecedent basis in these claims that require "*the*" or "*said" "at least one output"* in the *original* and *different formats*. The Board failed to address this claim construction argument made by SDT that requires the *same output* and found this claim unpatentable based

on Hardouin alone, concluding that generating an alerting signal is the "*original format"* and then *not* generating an alerting signal is the "*different format*" without analyzing the source of the "*different format*" output.

However, it is clear that the output in a "*different format*" in claim 10 of the '994 is based on the "*at least one output*," whereas in Hardouin, the output in a *different format* is based on the absence of an alerting signal which is different from the actual alerting signal, which is not generated in Hardouin. Thus, the *different format* output is not based on the "*at least one output*" as specified by claim 10. Appx 364-367, 978-979 (89-90).

This constitutes reversible error because under the correct claim construction, it is the "*at least one output"* that is the basis for both the "*original format"* and *"different format"* as specified in SDT's claims. In Hardouin, however, the two outputs are from a completely different and unrelated origin – not the *same* output as claim 10 requires. Thus, the Board's unpatentability determination should be reversed.

3. Claim 8 of the '170 Patent Demonstrates That Hardouin Does Not Teach "Muting."

Notably, dependent claim 8 of the '170 patent recites a limitation of "*preventing said audible tone from being provided to the driver*." This dependent limitation is not identified as part of, or having any relationship at

all, to the "*different output format*" recited in claims 1 and 14 of the '170 patent. Under the doctrine of claim differentiation, this feature in claim 8 cannot be deemed included within the meaning of "*muting*," which is recited as a possible "*different output format*" in only claim 14.

Yet, the Board's obviousness determination of claim 10, based solely on Hardouin, is premised on construing "*different output format*" to include "*muting*" and construing "*muting*" to include not generating an alert, which is essentially the same as "*preventing said audible tone from being provided to the driver*" as recited in claim 8. Appx1295(23:32-38). This conclusion is legal error. *See, e.g.*, '108 Surreply at 19-20.

A comparison of claim 8 of the '170 patent to claim 14 of the '170 patent makes clear that "*preventing an audible tone from being provided to the driver*" as recited in claim 8 is different than, and excluded from, the function of "*muting*" as recited in claim 14. For example, claim 8 of the '170 patent (Appx1295(22:32-38))specifies that:

> **8**. The method of claim **1** wherein the cell phone has at least one audible tone and wherein the method further comprises
> preventing said audible tone from being provided to the driver when the speed of cell phone is at or above the threshold and
> permitting the driver to access said audible tone when the speed of the cell phone is below the threshold.

Indeed, the scope of the claim term "*different output format*" in the claims at the issue *does not include* function of "*preventing the audible tone from being provided to the driver*." This functionality is clearly excluded from the "*different output format*" of claim 14 Appx1295(22:55-61) as demonstrated by the claim 8 language. Appx1295(22:32-38).

The functionality of "*preventing said audible tone from being provided to the driver*" is also not included within the meaning of "*muting*" as recited in claim 14. This means that "*muting*" cannot and does not have the same meaning as "*preventing said audible tone from being provided to the driver*" required to sustain the Board's unpatentability decision based on Hardouin. Different claim terms are presumed to have different meanings. *See, e.g., Ethicon Endo-Surgery, Inc. v. U.S. Surgical Corp.*, 93 F.3d 1572, 1579 (Fed. Cir. 1996).

Consequently, simply put, claim 8 expressly "*carves out*" the *exact* functionality of Hardouin relied on by the Board as the basis of its unpatentability ruling – *i.e.*, a phone whose audio output is disabled when above a certain speed – from the meaning of "different format" recited in claim 14 by claim 8. *Compare* Appx1295(22:55-61) withAppx1295(22:32-38). Thus, for the reasons above, the Board's obviousness determination of claim 10 based on Hardouin should be reversed.

4. The Board Failed To Adopt The Correct Definition Of Format

The Board erred in failing to construe "format" according to its plain and ordinary meaning, which SDT proposed as "a defined data structure arranged for the presentation and display of data." Appx1034-1108(¶¶ 48, 99); Appx 3927-3928 (Ex. 2019). The Board instead adopted a construction of "*format*" as including "*muting*" based on extrinsic evidence as discussed below.

Under SDT's definition of "*format*" when the phone of Hardouin has no audio output, it has no output, and that non-output has no format, meaning that it cannot satisfy element 10.3 or provide a "*different output format"* as required by claim 10. *See also, e.g.,* Appx 3176.

Under SDT's correct construction of "*format*," the non-generated signal of Hardouin cannot qualify as having a (different) format because it has no associated data structure to be presented or displayed. Indeed, it is nonsensical that the absence of a signal would have a format because there is simply nothing to be formatted. Accordingly, the Board's obviousness determination should be reversed.

5. The Board Adopted An Incorrect Definition of "Muting"

Well-known English dictionaries provide a reasonably reliable source of commonly used definitions of "muted" or "muting." SDT proposed the following definitions of "muted" and "muting,":

mut·ed (myo͞o′tid), *adj.* of low intensity and reduced volume; softened: *She spoke in muted tones.* [MUTE + -ED[2]] —**mut′ed·ly,** *adv.*

tr.v. **mut·ed**, **mut·ing**, **mutes**

1. To soften or muffle the sound of.

2. To soften the tone, color, shade, or hue of.

The dictionaries SDT cited agree that the common meaning of the words "mute," "muted," and "muting" all mean one or more forms of "reduced volume; to tone down, soften to muffle the sound of," *etc.* Appx3255.

When these definitions are further considered in connection with the intrinsic evidence of claim 8 of the '170 patent discussed above – it becomes clear what mute, muted, and muting *do not mean* – namely, they do not mean preventing, or silencing any audio output (*i.e.*, not generating an altering signal such as described in Hardouin). There is no evidence in the intrinsic record that the patentee used anything other than the plain and ordinary meaning above in the dictionaries, which are consistent with the intrinsic evidence of claim 8 of the '170 patent. SDT's expert agrees. *See* Appx3850(48:17-21).

THE WITNESS: Muting is just making something
more quiet, reducing the volume, making it softer.
Muting in that context still has a format that can be
applied, whereas disabling is completely off. There is
no formatting of a nothing when something is disabled.

Indeed, neither the word "*mute*" nor any of its variants appear in Hardouin. This is unsurprising because Hardouin does not mute anything. Even if the Board's incorrect construction of *muting* is affirmed, the Board's obviousness determination should be reversed for lack of substantial evidence. As noted above, when above the speed threshold, Hardouin does not generate any alarm or notification to the driver by sound, tactile sensation,

or visual screen. Moreover, if no alarm is generated, common sense dictates that there is no sound to mute. Simply put, an alarm signal needs to exists before it can be muted.

Under the correct construction of "*muting*," the Board's unpatentability determination based on Hardouin is untenable and should be reversed for lack of substantial evidence.

6. Only Claim 14 of the '170 is Affected By The Definition of Muting

Because the term "*muting*" appears only in claim 14 of the '170 Patent, that feature is to be included in that claim alone (claim 14 has no dependents). Therefore, any unpatentability analysis based on this feature can only affect the patentability of claim 14 and no other claims at issue. To the extent other claims have been ruled unpatentable as including the limitation "muting" in view of Hardouin alone, all those of determinations must be reversed.

C. The Claims In the '170 Patent And the '108 Patent Are Patentable Over Hardouin For The Same Reason Claim 10 of the '994 Is Patentable

The Board found dependent claims 3-4, 13, 16-17, 19, and 21 of the '170 patent, and claims 2, 12, 19-20, 23-24, 97 and 99 of the '108 Patent unpatentable based on Hardouin (either alone or in combination with other

references) for substantially the same reasons it determined claim 10 of the ‘994 Patent was unpatentable.

Specifically, the Board relied on the erroneous claim constructions of “*different format*” that are erroneous for substantially the same reasons as its construction of *different format*” in claim 10. Regardless of whether the Board based its obviousness determination on Hardouin alone or in combination with other references[4], the Board relied on Hardouin for supplying the “*different format*” limitation in the independent claims, not the other references that were combined with Hardouin.[5] Therefore, the Board’s obviousness determinations of these claims based on Hardouin in combination with other references and on Hardouin alone should be reversed as lacking substantial evidence for substantially the same reasons that the obviousness determination of claim 10, based solely on Hardouin should be reversed.

---

[4] For the ‘170 patent, Trauner U.S. 20020070852 (Appx2573-2593); Kruger U.S, Patent 7,711,355 (Appx2558-2566); for the ‘108 Patent, Okada U.S. Patent No. 6,166,656(Appx 3735-3748); van der Pol U.S. Patent No.6,397,133(Appx3758-3781); Mahvi U.S. 20030036823(Appx3782-3806); Gehlot U.S. Patent No 6,060,989(Appx3749-3757).

[5] The Board found dependent claims 3, 16-17, 19 and 21 of the ‘170 patent and dependent claims 2 and12 of the ‘108 patent unpatentable based on Hardouin alone. Appx 1241-1255; Appx 2790-2878. And the Board found dependent claims 4 and 13 of the ‘170 patent and dependent claims 19-20; 23-24 and 97-99 of the ‘108 patent unpatentable based on Hardouin in combination with other references. Appx1241- 1255.

If reversed, the claims that are patentable over Hardouin alone or in combination with other references, are claim 10 of the ‘994 patent, claims 3-4, 13, 16-17, 19 and 21 of the ‘170 patent, and claims 2, 12, 19-20, 23-24, 97 and 99 of the ‘108 patent[6].

D. The Board Erred In Construing Claim 31 Of The ’170 Patent And Finding Claim 31 Obvious Based On Hardouin

The Board erred in construing claim 31, in the context of its patentability analysis and finding claim 31 obvious based solely on Hardouin. Claim 31 requires “*changing*” an “*original input interface*” to an “*alternative input interface different than the original interface*” that is “*accessible from within the vehicle.*” Appx1296(25:4-9).

The Board acknowledged that the Hardouin keypad “may not physically change” (Appx1258) but reasoned that “changing the functions associated with the keys thereon provides different input interfaces.” But it also rejected SDT’s argument that the alternative input interface must also be at least “partially functional” as “beyond the scope of the claim, erroneously concluding that claim 31 “simply recites an original input interface and an alternative interface without any further description thereof.” (Appx1258)

[6] All combinations of prior art including Hardouin rely on Hardouin for providing the “different format” output.

However, the Board ignored that claim 31 recites both the original and alternative and different input interfaces are "*accessible from within the vehicle*." An input interface that is not functional and not capable of being used is not accessible from "within the vehicle."

The Board's ruling that the claimed alternative input interface need not be at least partially functional is incorrect (*see* '170 FWD at 68) because that renders the "alternative interface" inaccessible from within the vehicle – whereas claim 31 specifically requires the interface to be accessible. Claim 31 recites "the telematic device having at least one of an input interface accessible from within the vehicle..." Appx1296(25:5-7). The Board further opines the "alternative interface" can be a "not operational" keypad. Appx1258-1259. This is also error because, to the extent that the physical keypad itself - without any functionality - is identified as the interface, it is immutable and therefore cannot be both the original and the changed "alternative" interface. Indeed, the plain and ordinary meaning of "accessible" and the way "accessible" as used in the specification and claims dictates that the alternative and different interface must be at least partially functional and capable of being used or seen.

The Abstract and Summary of Invention describe "a communication device having at least one of an input *accessible* from within the vehicle and an output communicated within the vehicle." Appx1276(Abstract),1285(2:24-25) (emphasis added). Claim 12 recites "having visually *accessible* information changed to verbal announcements." Appx1295(23:51-52) (emphasis added).

Moreover, it is well understood that an interface is a portal between man and machine and when the interface is not functional, it ceases to qualify as an interface. Simply put, this claim cannot be construed to cover the merely same physical interface that appears the same to the driver at all times but is functional below the recited "threshold" and then not functional above the recited "threshold." '170 FWD at 65-69.

Hardouin devotes one sentence to the basic interface of the phone: "[E]lements 104, 110, and 111-114 provide the audio information received and transmitted to the user; whereas, elements 116-118 and 105 provide the basic user interface." Appx870 (1:64-65),867(Fig. 1).)

Significantly, Hardouin merely describes the presence of a keypad 105, with no further discussion of it. Therefore, when the keypad in Hardouin is "not-operational" it is not available, that is not "*accessible*" within the vehicle

as required by the claim itself. Thus, the Board's unpatentability determination based on Hardouin alone must be reversed.

E. The Board Erred In Construing Telematic Device And Based On That Erroneous Construction Finding Claims 1-10 Of The '994 Patent And Claims 1-21 and 31 Of The '170 Patent Obvious.

Claims 1-10 of the '994 patent and claims 1-21 and 31of the '170 patent all recite the term "telematic device." Appx1294-1295. SDT argued that "telematic device" should be construed according to its plain and ordinary meaning consistent with the specification as "*a central multifunction device such as a computer, PDA and the like that integrates together at least the features of information, communication, computing, and entertainment technologies*." *See e.g.*, FIELD OF THE INVENTION(Appx1284(1:16-24) and 1292(17:15-18).

The Board did not directly address SDT's claim construction position on telematic device, but rather explained its belief that the microprocessor described in the specification was part of some larger undescribed safety control system and that integrates the features above and that telematics device could not integrate these features – even though the preferred embodiment taught otherwise. The Board then opined that based solely on a long outdated extrinsic evidence source from 1978 that "telematic device"

should be broadly construed as a "*telecommunications and informatics device*." Appx1213-1215. This was legal error requiring reversal of the Board's obviousness determinations of these claims. Under a correct construction of these terms as SDT proposed, the Board's obviousness determination of these claims is not supported by substantial evidence.

The correct definition of the term "*telematic device*" is one that complies with the *Phillips* standard and is in accordance with the plain and ordinary meaning of this term provided in the specification. The meaning of "*telematics device*" is simply a combination of the definition of "*telematics*" provided by the specification and the computing platforms identified as performing certain required functions in accordance with the preferred embodiment. Namely, a telematic device is "*a central multifunction device such as a computer, PDA and the like that integrates together at least the features of information, communication, computing, and entertainment technologies*." *See, e.g.,* FIELD OF THE INVENTION – Appx1284(1:16-24) and 1292(17:15-18).

The preferred embodiment of the invention explains in more detail the specific functions of the telematic device that support this definition. In particular, the specification teaches: "According to… the… <u>preferred</u>

embodiment…a portable multi-function telematics device in the vehicle allowing access to the Internet or other network for transmitting and/or receiving faxes or e-mail or browsing the web or accessing a WAN." Appx1285(3:29-34), '994 col. 3:35-30 (emphasis added).

The sections of the specification discussing telematic devices have a direct one to one correlation with each other with respect to both hardware and functional requirements of the telematic device. In particular, the computing platforms such as telephone, computer, PDA, and like identified as *telematic devices* integrate the described features in the FIELD OF INVENTION in the '170 patent from the preferred embodiment as follows: 1) Information - the computing devices are multifunctional which provide various informational applications to the user. 2) Computing - each device is a computing platform as identified above. 3) Communication – each device can send and receive messages such email and/or faxes. 4) Entertainment – each device can browse the web which is an entertainment function. *See* Appx1460, (¶ 55),2744-2745.

SDT explained above why the Board's technical understanding of the invention is incorrect. SDT now explains why the Board's claim construction is incorrect.

The Board's definition is incorrect for at least 3 reasons. First, the Board's definition reads out the preferred embodiment of the invention. Second, the Board's definition, which is ostensibly based on SDT's expert's declaration is, in fact, directly contradicted by the expert in his declaration. Third, the Board's' definition is based solely on an extrinsic evidence source from 1978, 23 years before the priority of the SDT patents and long before the advent of the Internet or email – which conflicts with the intrinsic record functional requirement for telematic device (the specification).

Moreover, the Board's construction is incorrect because it has no requirement that the *telematic device* be able to browse the Internet or send and receive electronic messages such as email. There is no mention of this at all in Board's construction and these features are not used in the Board's patentability analysis. *See* Appx1246-1249. No "*telecommunications and informatics device*" as defined by the Board, such as a GPS system, was capable of performing these functions at the time if the invention, much less in 1978. A claim construction which excludes a preferred embodiment is rarely, if ever, correct. *On-Line Techs., Inc, v. Bodenseewek Perkin-Elmer GmbH*, 386 F.3d 1133, 1138 (Fed. Cir. 2004).

Moreover, the Board "credits" Mr. Peck for providing the definition of telematic device of "*telecommunications and an informatics device*." However, as Mr, Peck explains in his declaration, this definition from 1978 is outdated, and testifies that any definition of "*telematic device*" as of the priority date of the SDT Patents needs to include email and Internet browsing and endorsed the SDT definition presented herein. *See* Appx 3952-53 (¶30).

The Board ignores Mr. Peck's full testimony and instead, on its own accord, relies solely on the outdated extrinsic evidence-based definition provided at (Appx 3929), which was provided for historical context only and is *not* endorsed as appropriate by Mr. Peck in this case. Nor does Ford's expert, Mr. Andrews, endorse the Board's definition, which Ford did not pursue in papers, in favor of its own competing definition. Accordingly, despite the Board's assertion otherwise, there is no expert testimony supporting the Board's claim construction of "*telematic device*" in this case.

Moreover, the Board's reliance on extrinsic evidence over more reliable intrinsic evidence is legally improper. It is well-settled law that when the intrinsic record establishes the meaning of a claim term, relying on extrinsic evidence to alter that meaning is improper. *See Seabed Geosolutions (US) Inc*., 8 F.4th 1285, 1290 (Fed. Cir. 2021) (finding PTAB erred when relying

on extrinsic evidence to alter a claim construction inconsistent with intrinsic evidence). Here, as in *Seabed,* the Board ignores the intrinsic record evidence in favor of outdated conflicting extrinsic evidence.

Accordingly, there is no substantial evidence supporting the Board's position, but rather all substantial evidence, including all of the intrinsic evidence, supports SDT's construction of "*telematic device*." Thus, the Board's construction must be discarded as error, and SDT's construction adopted.

In addition to the legal error above, SDT notes that the Board has made a factual error in connection with applying its definition of *telematic device* to Hardouin based on a misreading of the evidence on record. The Board made the following finding in the Appx1249-1250 (emphasis added):

> To wit, Mr. Andrews testifies that 2G cellular services emerged around 1991, which is years before Hardouin's November 20, 1998, filing date, and that 2G services included short-messages services and the ability to access primitive web pages with a mobile phone via the Wireless Access Protocol (WAP). Ex. 1003 ¶ 92 (citing Ex. 1017, 20, 25, 305–306); Ex. 1027, code (22).
>
> In view of the foregoing, we are persuaded Hardouin's wireless telephone is a telecommunications and informatics device.

However, this finding is incorrect. To be clear, all that Mr. Andrews testifies to at Appx2395(¶ 92) is that 2G services were <u>introduced</u> around 1991

and that by 2002, short messages services (SMS) and Wireless Access Protocol (WAP) for phones were available. Neither Mr. Andrews nor any of the materials cited by the Board provide any specific date that Internet access, WAP or SMS were available by phone or other mobile device. There are no specific dates provided in the Andrews Declaration nor in the cited references other than for the introduction of 2G services in 1991. The Andrews Declaration and cited evidence establishes only that these features were available by 2002 (after the 2001 priority date of the SDT patents). Nothing more.

Accordingly, there is no evidence relied on by the Board that WAP or SMS were available by Hardouin's November 20, 1998, filing date, let alone "years" before that date (*e.g.*, it is well-known Internet browsers did not exist in 1991 and would not exist until the mid-1990s). In addition, Ford did not attempt to combine Mr. Andrews declaration (or any other reference) with Hardouin, in the way the Board did, which appears to be a new argument presented by the Board on Ford's behalf, which is impermissible and should be disallowed. Thus, the factual underpinning of the Board's legal conclusion is not supported by substantial evidence should be reversed as well as the Board's obviousness determination.

F. The Board Erred In Construing "Providing The Driver A Signa1" As Recited Claim 10 of the '170 Patent And Based Thereon Determining That Claim 10 Was Obvious.

Claim 10 of the '170 patent recites "providing the driver a signal." Appx1295 (23:43-45). The Board erred in failing to adopt SDT's proposed construction of *"[p]roviding a signal that actuates or (puts into action) an audio or visual indicator*." Appx1458. Instead, the Board adopted Ford's construction of "*providing the driver with an audible, visual, or tactile indicator*" that did not require the signal be "actuated" and that encompassed "blanking" a screen or a "suppressed signal" *i.e.*, removing a signal rather than supplying it, as found in the prior art. Appx 1217. The Board's conclusion seems to require that control signals travel "device to device" such that the control signal then terminates and is not provided to the driver, that it relied upon to support its construction is incorrect for numerous reasons. *Id.* FWD at Appx1215-1216.

First, specification clearly teaches a signal is provided to the driver whether directly from the microprocessor or not. For example, *see* Appx1290(13:3–13) "block 44 effective to actuate a <u>visual indicator viewable by the driver</u>; (13:36–38) "Outputs 44 and 45 can <u>activate visual and/or audible alarms to draw the driver's attention</u> to desired locations in the vehicle; 14:24–

27 "and also signal 44 actuating a visual indicator within the vehicle to indicate this condition (block 54)". *See also id.* 14:36–41, 14:51–54, Figs. 3–4.

Second, it appears the Board's ruling is based on the unstated requirement that the microprocessor provide a control signal *directly* to the driver. But this is a limitation not found in the claim. The Board has apparently added this limitation to the claim to justify its conclusion. It is enough to satisfy the claim that a signal is provided to the driver, whether that signal comes directly from the microprocessor or not. Indeed, the signal provided to the driver may simply be caused by the microprocessor. The signal provided to the driver is not required to have a specific origin by the claim.

Third, as described above, there is only one telematic device in independent claim 1 of the '170 patent, so even under the Board's construction, there are no "device to device" communications that Board contended caused the disconnect it relied upon in rendering the claim obvious. Therefore, the basic premise of the Board's ruling is flawed based on the claim language itself. Indeed, the signal from the telematic device may be provided directly to the user.

Under a correct construction of "*providing the driver a signal*," the Board's obviousness determination should be reversed for lack of substantial evidence.

G. The Board Erred In Construing "Downloading" As Recited In Claim 20 Of The '170 Patent And Based Thereon Determining That Claim 20 Was Obvious.

"Downloading" appears in claim 20 of the '170 patent. Appx1295(24:13-15). The Board erred in construing "downloading" as "transmitting from a central computer to a remote computer" in a manner that ignores the both the specification and the specific language of the claim itself that requires the downloading of an "operating system," or "software" or "new application," all of which require a request. SDT argued that "downloading" should be construed as requiring a request. The Board admits it did not consider this argument in rendering its ruling '170, which provides specific support for SDT's construction and requires reversal of its obviousness determination.

The Board opined at Appx1219 that:

> To the extent Patent Owner is arguing that a person of ordinary skill in the art would have understood that downloading data, software, operating systems, and applications requires a data transfer protocol having a

> request, we find no support in the record for such an argument.

However, this statement is untrue. SDT specifically argued in its papers that:

> Indeed, claim 20 itself provides guidance to its meaning. It describes steps of downloading data, software, <u>operating systems</u>, and <u>new applications</u>. A POSA would understand that errors typically occur during transfer of information and recognize the need for a reliable download protocol for these import types of downloads. The HTTP and FTP protocols as described in the '170 patent at 16:64-67 ensure such reliable downloads required to achieve the goal of the claim as would be understood by a POSA as such. Indeed, a <u>POSA would understand at the time of the invention that a WAN, Web site, FTP service and/or email were commonly used to download software, operating system or to add new applications</u>. EX. 2031, ¶17.

Appx 1557(emphasis added). Ex. 2023 (Appx2669-2670) explains that a download, such as an http transfer (hypertext transfer protocol), as would be understood by an ordinary artisan, requires the client to request from the server the information to be downloaded. This is because the client needs to establish a reliable communication channel with the server for information transfer and reserve client resources such memory space and initialize a communication pathway for successfully receiving the requested information. Appx 1557.

Moreover, the specification excerpt that the Board cited refers to a local transfer of preferences within the telematic system of FIG. 1 of the '170 patent, that is from the telematic device to the vehicle's state machine. *See* '170 FWD at 30. However, it is well known that software such as new operating systems or applications must come from a remote source such as a remote server hosting such software which would be transferred through an *htttp* or similar transfer protocol. Thus, under the correct construction, the Board's obviousness determination of claim 20 of the '170 patent should be reversed as not supported by substantial evidence.

VIII. CONCLUSION

For the reasons stated above, SDT requests the court either reverse or remand the FWDs for the '994 patent, '170 patent, and '108 patent for a trial of the issues under the current construction of the claims at issue.

ADDENDUM

TABLE OF CONTENTS TO ADDENDUM

Trials@uspto.gov
571-272-7822

Paper 30
Entered: February 7, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORD MOTOR COMPANY,
Petitioner,

v.

SAFE DRIVING TECHNOLOGIES LLC,
Patent Owner.

IPR2021-01341
Patent 9,713,994 B2

Before SCOTT C. MOORE, RYAN H. FLAX, and BRENT M. DOUGAL, *Administrative Patent Judges*.

FLAX, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Granting Petitioner's Motion to Exclude
35 U.S.C. § 318(a); 37 C.F.R. § 42.64

I. INTRODUCTION

Safe Driving Technologies LLC ("Patent Owner") is the owner of U.S. Patent 9,713,994 (Ex. 1001, "the '994 patent"). Paper 6, 1. Ford Motor Company ("Petitioner") filed a Petition for *inter partes* review challenging claims 1–4 and 7–10 of the '994 patent.[1] Paper 4 ("Pet."). We instituted trial in this proceeding on all grounds and over all challenged claims on February 11, 2022. Paper 11 ("DI" or "Institution Decision"). After institution, Patent Owner filed a Response (Paper 15 ("Resp.")), to which Petitioner filed a Reply (Paper 17 ("Reply")), to which Patent Owner filed a Sur-Reply (Paper 18 ("Sur-Reply")). A final hearing was held on November 14, 2022, at which the parties presented oral argument in support of their positions in this case. Paper 29 ("Hr'g Tr.").

Petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to Patent Owner.[2] *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must prove unpatentability by a preponderance of the evidence. *See* 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d) (2019).

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[1] Claims 5 and 6 of the '994 patent are not challenged in this proceeding. Pet. 2–3.

[2] Although we refer to certain of Patent Owner's arguments in this proceeding as unpersuasive, we do not shift the ultimate burden of proof from Petitioner. Unpersuasiveness here is in the context of the parties' arguments and the evidence of record. *See Essity Prof'l Hygiene N. Am. LLC v. Cascades Canada ULC,* 811 Fed. App'x 643 (Fed. Cir. 2020).

After considering the parties' arguments and supporting evidence, we conclude that Petitioner has met its burden to prove claims 1–4 and 7–10 are unpatentable over the asserted prior art.

Petitioner also filed a Motion to Exclude certain of Patent Owner's evidence. Paper 23 ("Motion" or "Mot."). Patent Owner opposed this motion (Paper 24 ("Opposition" or "Opp.")) and Petitioner filed a Reply to Patent Owner's Opposition (Paper 25 ("Opp. Reply")). For reasons discussed herein, the Motion is *granted*.

A. REAL PARTIES-IN-INTEREST

Petitioner identifies itself as a real party-in-interest. Pet. xii. Patent Owner identifies itself and also "General Patent Corporation" as real parties-in-interest. Paper 6, 1.

B. RELATED MATTERS

Petitioner identifies *Safe Driving Technologies LLC v. Ford Motor Company*, 1-21-cv-00064 (D. Del.) (the "related district court litigation") as a related matter. Pet. xii. Patent Owner identifies this same litigation as a related matter and also identifies the following other related matters: IPR2021-01353 concerning U.S. Patent 10,532,709; IPR2021-01446 concerning U.S. Patent 9,047,170; and IPR2022-00086 concerning U.S. Patent 8,301,108. Paper 6, 1. The parties indicate that these other patents are also at issue in the related district court litigation. Pet. xii; Paper 6, 1.

C. THE '994 PATENT

The '994 patent issued on July 25, 2017, from U.S. Application 15/352,206, which was filed on November 15, 2016. Ex. 1001, codes (45), (21), (22). On its face, the '994 patent identifies its priority to U.S. Application 14/661,589, which was filed on March 18, 2015. *Id.* at code

(63). However, in its written description, the '994 patent further references priority, ultimately, to U.S. Provisional 60/336,293, which was filed October 24, 2001. *Id.* at 1:6–17. There is no meaningful dispute here that the '994 patent is entitled to priority to this provisional application. *See, e.g.*, Pet. 3 (Petitioner asserts that the ordinarily skilled artisan would be someone as of October 24, 2001), 7 (Petitioner states all the asserted references predate October 24, 2001); *see also* Hr'g Tr. 44:17–45:11 (Patent Owner identifying the effective filing date, or priority date, of the '994 patent as the filing date of the provisional application in 2001).

The '994 patent's Abstract summarizes the invention as follows:

> According to one aspect of one embodiment of the present invention, a safety control system for using applications in vehicles, includes, a communication device having at least one of an input accessible from within the vehicle and an output communicated within the vehicle, at least one sensor operable to sense at least one condition related to vehicle operation, and data about distraction features of a running application, [] and a controller communicated with the sensor and the communication device to selectively suppress at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold. When an input is suppressed, the driver is prevented from accessing or inputting information into the communication device. When an output is suppressed, communication between the device and the driver of a vehicle is suppressed to, among other things, avoid distracting the driver during certain driving situations or conditions relating to the driver, vehicle and/or environment.

Ex. 1001, Abstract.

For context, regarding the claimed safety control system, the '994 patent's Figure 1, reproduced below, illustrates a vehicle having such a system:

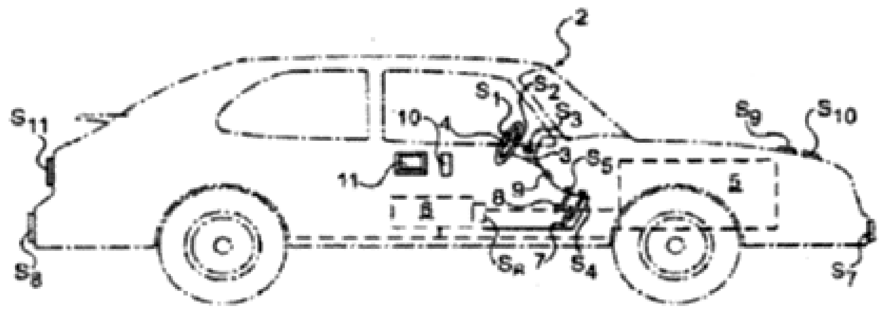

Figure 1

The ’994 patent states that “FIG. 1 schematically illustrates one form of a safety control system for vehicles constructed in accordance with the present invention.” *Id.* at 5:14–16. Figure 1 shows vehicle 2 (a “conventional vehicle”), including steering mechanism 3 (column), steering wheel 4, engine 5, torque converting means 6 (e.g., transmission and driveshaft), acceleration pedal 7, brake pedal 8, visual indicator and audio alarms 9 (collectively), cellular telephone 10 adjacent computer 11 (identified as telematic devices), and sensors S_1–S_{11} distributed throughout the vehicle. *Id.* at 5:35–6:61. Sensors S_1 and S_2 are on steering wheel 4 and sense a driver, sensor S_3 is on steering mechanism 3 and senses changes in steering direction or actuation of turning indicator, sensor S_4 senses gas pedal 7 condition and/or vehicle speed or acceleration, sensor S_5 senses brake pedal 8 condition, sensor S_6 senses transmission condition at torque converter 6, sensors S_7 and S_8 sense vehicle proximity to other vehicles, sensor S_9 senses darkness or headlight activation, sensor S_{10} senses weather conditions, and sensor S_{11} senses turn signal activation. *Id.* at 6:35–61, 9:33–35.

In addition to cell phone 10 and computer 11 discussed above, the ’994 patent identifies other telematic devices that provide email, radio, CD or DVD play, navigation system, paging, and the like, as well as blackberry

and PDA devices, etc. *Id.* at 5:56–58, 15:42–43. Figure 3, reproduced below, illustrates how the aforementioned sensors and various telematic devices are interconnected in a system via a microprocessor, which controls their functions:

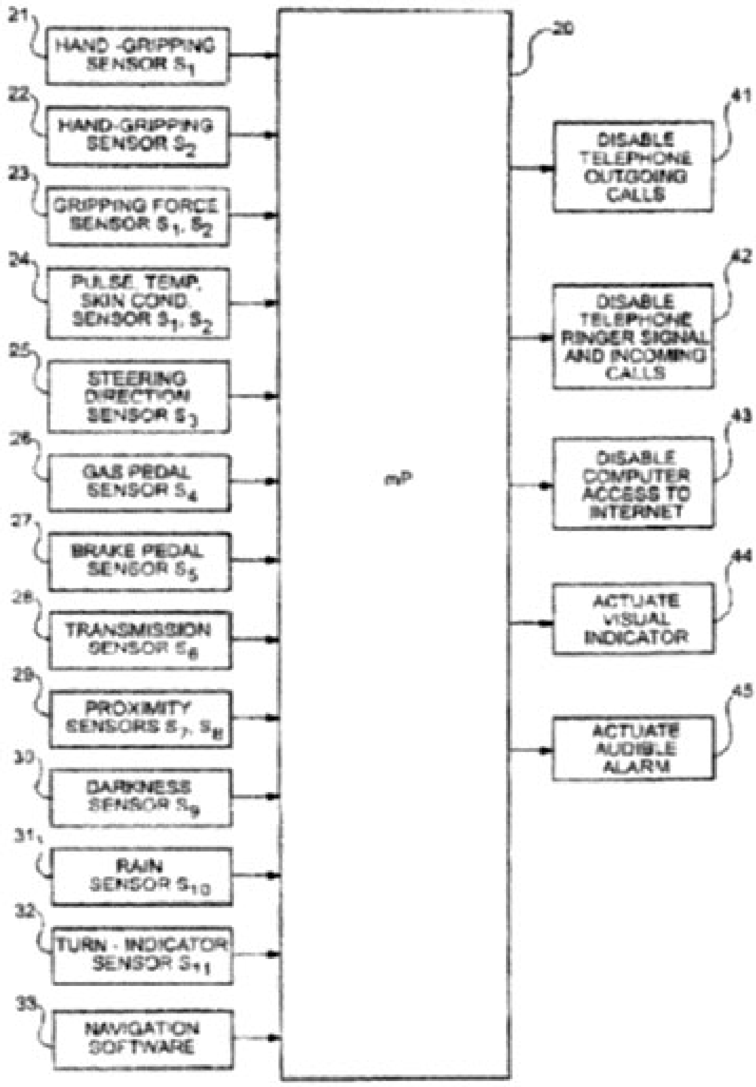

Figure 3

The '994 patent states that "FIG. 3 is a block diagram illustrating the main components in the system of FIG. 1." *Id.* at 5:19–20. Figure 3 shows as a central block microprocessor (mP) 20, which is connected to and, as

indicated via arrows, receives inputs 21–33 from each of the aforementioned sensors S_1–S_{11}, as well as from navigation software 33. *Id.* at 9:50–11:11. Figure 3 also shows that microprocessor 20 is further connected with and, as indicated via arrows, provides output to control disabling of telephone outgoing calls (block 41), disabling of telephone ringer signal and incoming calls (block 42), disabling of computer access to internet (block 43), actuating of visual indicator (block 44), and actuating of audible alarm (block 45). *Id.* at 11:12–14:27.

The '994 patent calls microprocessor 20 a "state machine" for its ability to perform these functions. The '994 patent states:

> The state machine aspect of the microprocessor may make telematic control decisions on a variety of criteria such as: (a) the frequency of use of the application, the frequency in which a number, e-mail or URL is contacted; (b) based on safety/urgency priorities, e.g. cruise or CD changer, cell messages or other telematics, or music played on the radio; (c) as preset by the operator; (d) optionally, based on other collected information from the driving system, the microprocessor will initiate calls at predetermined times out of voice mail as, for example, when the driver completes backing out of a driveway and begins a trip.

Id. at 11:18–30. The operation of an embodiment of such a system is illustrated by the '994 patent at Figure 4, which we reproduce below:

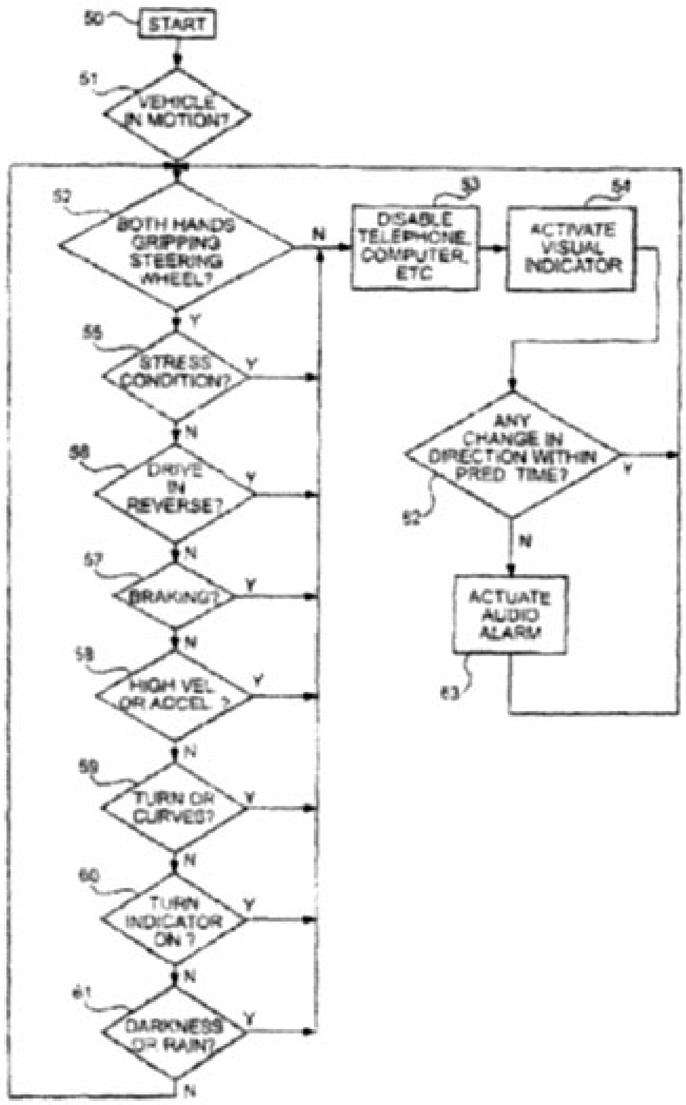

Figure 4

The ’994 patent states that “FIG. 4 is a flowchart illustrating the operation of the system of FIG. 1.” *Id.* at 5:21–22. Figure 4 shows operational and algorithmic decision making of the state machine, which (via the aforementioned sensors) senses whether the vehicle is in motion (block 51), and thereafter uses sensor input to determine if potentially distracting conditions are met (blocks 55–61). *Id.* at 13:59–14:40. According to Figure

4, if microprocessor 20 determines a distracting condition is present, it outputs signals to disable vehicle components, e.g., phone, computer, etc., and provides an indicator of the condition. *Id.* Figure 4 shows that once the vehicle is started and is in motion, an ordered series of events can be sensed, as follows: the system senses 52 whether "both hands [of the driver are] gripping [the] steering wheel," if not the system disables the telephone 53, etc., if so the system then senses 55 whether there is a "stress condition," if not the system senses 56 whether the vehicle is "driv[ing] in reverse," if not the system then senses 57 whether the vehicle is "braking," if not the system then senses 58 whether the vehicle is traveling at a "high vel[ocity] or accel[erating]," if not the system senses 59 whether the vehicle is "turn[ing] or [traveling in] curves," if not the system senses 60 whether the vehicle's "turn indicator [is] on," if not the system then senses 61 whether the vehicle is in "darkness or rain," if not the system starts this process all over again. If any of the events just listed (other than hand positioning) are sensed in the affirmative the system then disables 53 the telephone, computer, etc., and activates 54 a visual indicator. *See id.*

The described factors that can be monitored and considered as potential distractions are numerous and are listed in Figure 5B of the '994 patent. *Id.* at 17:58–21:6. They include, for example, state of the transmission, vehicle speed, and noises, and the system may take certain thresholds into consideration, for example vehicle speed, to determine whether to restrict, suppress, or disable components. *Id.* For example, if the system senses a high vehicle speed it may disable the telephone entirely, but if it senses a slower vehicle speed it may enable the telephone's operation. *See id.* at 20:23–31.

The ’994 patent concludes with 10 claims, of which claims 1, 9, and 10 are independent claims. *Id.* at 22:42–24:59. Claim 1 is illustrative and reproduced below with added sub-numbering, as used by the parties (*see, e.g.*, Pet. 13–27; Resp. 19–38):

> **[1.0]** 1. A safety control system for vehicles comprising:
>
> a telematic device running at least one software application and having at least one input and at least one output;
>
> **[1.1]** at least one sensor operable to sense at least one condition related to a driving environment and data providing information indicating at least one distracting feature for at least one software application;
>
> **[1.2]** a controller in communication with the sensor and the data and the software application and the telematic device, the controller configured to prevent the at least one application output from being provided to the driver in the original format of the at least one output and to provide the at least one output to the driver in a different format, and
>
> **[1.3]** wherein the controller controls when at least one input into the software application and at least one output from the software application are provided to the driver so that prior to permitting the driver to access the input or prior to providing an output from the software application on the telematic device to the driver, the controller determines whether said at least one condition is within a threshold and permits the driver to access said input or provides said output to said driver only when said at least one condition is within the threshold.

Ex. 1001, 22:42–67. The ’994 patent’s claims 2–8 depend, directly or indirectly, from independent claim 1 (as noted above, claims 5 and 6 are not challenged). *Id.* at 23:1–24:6.

D. SUMMARY OF ASSERTED GROUNDS FOR UNPATENTABILITY

Petitioner asserts the following grounds for the unpatentability of claims 1–4 and 7–10 of the '994 patent:

Ground	Claims Challenged	35 U.S.C. §[3]	Reference(s)/Basis
1	1–4, 7–9	103	Tan[4]
2	1–4, 7–9	103	Boies[5]
3	2, 7, 8	103	Tan, Shuman,[6] Behr[7]
4	10	103	Hardouin[8]

See Pet. 2–3.

In support of the grounds for unpatentability Petitioner submits, *inter alia*, the Declarations of Scott Andrews (Ex. 1003; Ex. 1039). Patent Owner in opposition to Petitioner's grounds submits, *inter alia*, the Declaration of John Peck (Ex. 2027). We find Mr. Andrews and Mr. Peck each competent to testify as to the perspective and understanding of the person of ordinary skill in the art, as defined herein. *See infra* Section II.A; *see also* (describing the witnesses' backgrounds, qualifications, and considered materials) Ex. 1003 ¶¶ 5–22, 28, 31, 35, 39–41; Ex. 1004; Ex. 2027 ¶¶ 8–18, 20–21, App'x A.

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[3] The '994 patent has an uncontested priority date of October 24, 2001, which is before AIA revisions to 35 U.S.C. § 103 took effect on March 16, 2013. 35 U.S.C. § 100 (note). Therefore, pre-AIA § 103(a) applies. Our decision is not impacted, however, by which version of the statute applies.
[4] US 6,574,531 B2, issued June 3, 2003 (Ex. 1025, "Tan").
[5] US 6,266,589 B1, issued July 24, 2001 (Ex. 1026, "Boies").
[6] US 6,161,071, issued Dec. 12, 2000 (Ex. 1029, "Shuman").
[7] US 5,808,566, issued Sept. 15, 1998 (Ex. 1012, "Behr").
[8] US 6,311,078 B1, issued Oct. 30, 2001 (Ex. 1027, "Hardouin").

II. DISCUSSION

A. LEVEL OF ORDINARY SKILL IN THE ART

In determining the level of ordinary skill in the art, we consider, for example, the types of problems encountered in the art, the prior art solutions to those problems, the rapidity with which innovations are made, the sophistication of the technology, and the educational level of active workers in the field. *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986).

Petitioner asserts:

> An ordinary artisan would have been a person having, as of October 24, 2001, a Bachelor's degree in Electrical Engineering, Mechanical Engineering, Computer Engineering, or Computer Science, or an equivalent degree with at least two years of experience in electronic user interface systems and vehicle sensor systems or related technologies. Additional education may substitute for lesser work experience and vice-versa. (Ex.1003, ¶40.)

Pet. 3 (citing Andrews Declaration). Patent Owner does not address the definition of the person of ordinary skill in the art, either to contest Petitioner's proposal or to offer a different definition. *See generally* Resp.

We adopt Petitioner's unopposed definition of the person of ordinary skill in the art (or ordinarily skilled artisan), which appears to be consistent with the level of skill in the art reflected in the prior art of record and the disclosure of the '994 patent. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) ("the prior art itself [may] reflect[] an appropriate level" as evidence of the ordinary level of skill in the art) (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985)).

B. CLAIM CONSTRUCTION

The Board interprets claim terms in an *inter partes* review using the same claim construction standard that is used to construe claims in a civil action in federal district court. 37 C.F.R. § 42.100(b). In construing claims, district courts and the Board here, by default, give claim terms their ordinary and customary meaning, which is "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

Should claim terms require express construction, sources for claim interpretation include "the words of the claims themselves, the remainder of the specification, the prosecution history [i.e., the intrinsic evidence], and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art." *Id.* at 1314 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)). "[T]he claims themselves [may] provide substantial guidance as to the meaning of particular claim terms." *Id.* However, the claims "do not stand alone," but are part of "'a fully integrated written instrument' . . . consisting principally of a specification that concludes with the claims," and, therefore, the claims are "read in view of the specification." *Id.* at 1315 (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 978–79 (Fed. Cir. 1995) (en banc)).

Any special definition for a claim term must be set forth in the specification "with reasonable clarity, deliberateness, and precision." *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Without such a special definition, however, limitations may not be read from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

"[W]e need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy.'" *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner asserts "that the limitations of the claims from the '994 Patent at issue in this IPR can be understood based on their ordinary and customary meaning as understood by one of ordinary skill in the art, and therefore no claim construction is necessary at this time." Pet. 8.

However, Petitioner does discuss a dispute in the related district court litigation concerning the meaning of the language of dependent claim 2 directed to a "communication device including *at least* a pager, a telephone, a global location sensor, a temporal sensor, an optical sensor, a heading sensor, a bearing sensor, and an altitude sensor." *Id.* (citing Ex. 1001, 23:1–26). Petitioner explains that there is some ambiguity whether the language "at least" means that each of the subsequently listed devices are required or only one of those devices is required. *Id.* at 8–9; *see also* Ex. 1033 (email from related district court litigation addressing claim 2's meaning). In view of this ambiguity, Petitioner explains it has challenged claims 2, 7, and 8 under Grounds 1 and 2 as if the respective language means "at least one of" and under Ground 3 as if the language means "each of." Pet. 8–9. We address this claim language below.

Patent Owner includes in its Response a section with the heading "CLAIM CONSTRUCTION," including a table listing what Patent Owner asserts are each party's proposed constructions for "telematic device," "communication," and "communication device including at least a pager, a

telephone, a global location sensor, a temporal sensor, an optical sensor, a heading sensor, a bearing sensor, and an altitude sensor." Resp. 17–19. However, Patent Owner provides no accompanying argument or cited support (other than a cite to a Joint Amended Claim Chart, Exhibit 2026, from a related District Court proceeding). *Id.* Patent Owner merely states that "[f]or the reasons set forth below [in its Response], all of the claims of the '994 are patentable under either Patent Owner's or Petitioner's claim constructions." *Id.* at 19.

We address the claim terms below for which the parties have identified a need for construction. If in the context of our patentability analysis that follows other claim interpretation is necessary, we address it in the same portion of this decision in which that analysis occurs and as a part of that analysis.

1. "telematic device"

The term "telematic device" appears in claims 1, 3–7, 9, and 10. Ex. 1001, 22:42–24:58.

Although, as noted above, Patent Owner provides no argument and cites no supporting evidence in its briefing under the heading "CLAIM CONSTRUCTION," elsewhere in its Response, Patent Owner argues that the claim term "telematic device" (Patent Owner, and at times also Petitioner, uses the term "telematic<u>s</u>," which is not recited by the claims), must be "*a central multifunction device that integrates together the features of information, communication, computing, and entertainment technologies*" because the "FIELD OF THE INVENTION" portion of the '944 patent states this. Resp. 10–11 (citing Ex. 1001, 1:20–26, 3:35–40, Fig. 5B); *see also* Ex. 2027 ¶ 50 (Mr. Peck providing this same definition for "telematic

device”); *but see id.* ¶ 30 (Mr. Peck testifying that “telematics” is “a concatenation of two words – ‘telecommunications’ and ‘informatics’” and that “[t]elematic devices initially were devices that combine location technology . . . with computing capability and some form of data communications.”). Patent Owner argues that, in the ’994 patent, “the inventor acts as his own lexicographer (which, in this case, is the same as the Plain and Ordinary meaning).” Resp. 11.

Patent Owner states (again, without supporting argument or evidence) that:

> It is indisputable that the multiple applications such as navigation, mobile phone interface, Internet access, radio, and vehicle status (low battery *etc.*) and others that are provided by a telematics device to a driver are necessarily done through a singular integrated multimedia output device such as a multifunction screen having both audio and visual components.

Id.

Petitioner disputes this with argument and cited evidence. Reply 2–6.

Petitioner argues that “[t]he term ‘telematics device’ should be given its plain and ordinary meaning in view of the intrinsic evidence,” but “[t]o the extent construction is necessary, Ford submits that ‘telematics device’ should be construed as ‘a telecommunications device such as a telephone, PDA, computer, blackberry, and the like.’” *Id.* at 2–3 (citing Ex. 1001, 14:42–43, 16:39–40, 16:57–59); *see also* Pet. 15, 40, 70. As to the plain and ordinary meaning, Petitioner’s position is that a “telematic device” is a telecommunications device. Reply 3; *see also* Ex. 1003 ¶ 56 (discussing telematics devices as including some combination of communications and location services), ¶ 86 (describing cell phones between 1991–2002 as including “data oriented services”).

We find Patent Owner's reliance on the '994 patent's FIELD OF THE INVENTION Section misplaced. To quote it in its entirety, it states:

> The present invention relates to the field of ***telematics, namely to the field of integrating information, communication, computing and entertainment technologies <u>into vehicles</u>*** for civilian or military use. The invention particularly relates to safety control systems for vehicles to reduce driver distraction, avoiding potentially dangerous conditions tending to produce accidents.

Ex. 1001, 1:21–27 (emphasis added). Thus, even were we to consider this portion of the Specification informative of the meaning of "telematic device," it does not limit such to "a central multifunction device," as argued by Patent Owner, but states that the field of telematics relates to integrating information, communication, computing, and entertainment technologies *into vehicles*, generally. *Id.* Nothing about this statement requires all these features to be integrated into a single device, unless the vehicle is considered the single device (which neither party suggests). *See* Reply 4 (discussing this section of the '994 patent).

Further, we find nothing in the '994 patent supporting Patent Owner's contention that the claim term "telematic device" should be restricted to *a central multifunction device that integrates together the features of information, communication, computing, and entertainment technologies.* The '994 patent never states this. *See* Ex. 1001. Moreover, we find the '994 patent to be much more inclusive than exclusive when describing what a telematic device can be, i.e., the scope of the term.

Upon reviewing the written description of the ’994 patent, we find it makes the following statements (all emphasis added):

- “The ***use of telematics in general and particularly cellular telephones*** by drivers while driving . . . .” Ex. 1001, 1:33–37.
- “[M]any states and countries have enacted legislation requiring that ***telephones used in vehicles by drivers while driving must be of the ‘hands free’ type and usually telematics equipment carries a warning*** to educate and discourage the driver about the risk of using these devices while driving.” *Id.* at 1:39–44.
- “One example of a hazardous situation avoided by the control system illustrated in FIG. 1 is the ***use of the vehicle telephone in certain situations wherein a making of a telephone call by the vehicle driver, or the receiving of an incoming call, particularly the ringing of such a call, may distract the driver*** and increase the possibility of an accident when the driver is in a high-risk driving situation. Similar increased risk can result from the driver changing vehicle controls like temperature settings, or interacting (e.g. inputting or receiving output) with ***other telematics*** such as e-mail, radio, CD, DVD, navigation system, incoming page or the like. In such cases, ***the vehicle telephone, other telematics and/or other input/output devices are suppressed*** and no incoming or outgoing signals are allowed to distract the driver.” *Id.* at 5:47–61.
- “FIG. 1 further schematically illustrates ***a cellular telephone 10*** within the vehicle, and a computer 11 or ***other multifunction telematic device*** allowing access to the Internet for transmitting and/or receiving faxes or e-mail, WAN and Web access, or other input/output device.” *Id.* at 6:23–27.
- “One important control function is to ***disable an incoming call from ringing the telephone 10***, and the computer or ***other telematics portable or built in 11*** from

accessing the Internet or announcing incoming signals, e.g. page, e-mail etc., and to indicate same by actuating a visual indicator and an audio feedback if a driver attempts to initiate telematics during an unsafe or a high risk condition, and may direct a driver to alternative driving habit to gain access to telematics." *Id.* at 6:66–7:7.

- "As will be described more particularly below, sensors S1 and S2, FIGS. 2, 6, thus sense that both driver's hands are present on both sides of the steering wheel 4 to ***enable operation of the telephone 10 and the computer 11 or similar multi-function or standalone telematics or other devices***. Thus, ***the telephone 10 can be permitting 'hands free operation' or a telephone/telematics system that can be used as such with an adapter or when docked to the system gateway***, as required by-many laws to avoid accidents, but also the driver is permitted to use the telephone only in a 'hands free' manner, thereby precluding the driver from gripping a ***telephone*** to operate it even though the ***telephone*** or the telematics system may have a 'hands free' capability." *Id.* at 7:52–64.
- "[C]onditions can be sensed to ***disable the telephone*** for further reducing the possibility of an accident." *Id.* at 8:8–10.
- "When drowsiness is sensed, ***the telephone 10 would not be disabled*** since the ringing of an incoming call may be further effective to arouse the driver." *Id.* at 8:38–40.
- "The conditions sensed by sensors S_7-S_{11} are also such that a hazard may be produced if, during the existence of such a condition, the full attention of the driver would be diverted by the ringing of the ***telephone*** or by the use of the ***telephone*** for making an outgoing call. Accordingly, under such conditions, ***the telephone 10 is disabled*** from operation. Similarly, the ***computer 11, if present***, is disabled from operation to preclude access to the Internet for transmitting and/or receiving faxes or e-mail, which

could also result in a similar distraction increasing the possibility of causing an accident. And further, ***other devices, including telematic devices***, vehicle signals or alarms, and the like can be ***suppressed or disabled*** to avoid or limit distractions to the driver under certain conditions." *Id.* at 9:36–49.

- "The outputs from microprocessor 20 include control signals as shown by the following blocks: block 41, effective to ***disable the telephone or other telematics*** from making outgoing calls; block 42, effective to ***disable the telephone or other telematics*** from receiving incoming calls and from actuating the ringing signal . . . ." *Id.* at 12:42–47.
- "In addition to ***disabling incoming telephone calls***, output 42 or some other output can disable the output of any or all input/output devices to prevent communication to the driver of the particular output signals from these devices." *Id.* at 12:59–62.
- "If such a stress condition is indicated as being present, the ***telephone***, computer, vehicle alarm or signal, etc. are also disabled (block 53), and a visual indicator activated (block 54) to indicate this condition." *Id.* at 14:10–13.
- "In addition to ***use of a telephone or other telematic device***, the switches on the steering member 3 can also be used to control the radio, CD player, cruise control, and environmental settings in the vehicle such as the interior temperature, and blower and heat/AC settings." *Id.* at 15:39–43.
- "[T]he driver must actually use this 'hands free' capability created by the system gateway in order to make or receive ***telephone calls or other telematics activities***. In addition, other sensors could also be provided ***to disable a vehicle telephone or a multi-function telematics system*** or Internet access provided by a vehicle computer in response to other conditions . . . ." *Id.* at 16:13–19.

- "The state machine can allow driver to set their preferences on ***a portable telematics device such as a cellular phone***, or a WAN, Web site or via a FTP and e-mail. Such set up can be transferred to the vehicle in use ***when the driver docks the cell phone or other portable telematics devices*** to the system gateway." *Id.* at 16:39–44.
- "The information may be stored in any suitable form on ***any suitable device including on a telematic device (e.g. telephone, PDA, computer, and the like***) . . . ." *Id.* at 16:57–59.
- "And further examples include input and output features of various devices communicated with the driver such as ***telephones***, pagers, PDA's, computers, fax machines, GPS devices, navigation systems and displays, radios, CD players, CB's, video monitors, ***and other telematic or informational devices***." *Id.* at 18:7–14.
- "***The communication device can be at least any of those previously mentioned herein, for example without limitation, a telephone***, PDA, computer, vehicle alarm or indicator, navigation system, DVD player/recorder, CD player/recorder, ***and other electronic and/or telematic*** or other input/output devices accessible by the driver, and/or providing information or some communication to the driver." *Id.* at 22:4–11.

Based on the above, and considering the '994 patent in its entirety, it is apparent on this record that a cellular (mobile) telephone is within the scope of the claim term "telematic device." *See* Hr'g Tr. 65:7–13 (Patent Owner confirming at oral argument that the '994 patent's example of a cellular phone satisfies the claimed "telematic device."). In fact, much of the '994 patent's written description is focused on controlling a cellphone (e.g., cellular telephone 10 illustrated in Fig. 1) based on sensed, potentially distracting conditions related to driving. *See generally* Ex. 1001. This is

important here because some of Petitioner's challenges to patentability in this proceeding rely on prior art alleged to disclose the control of a cellular phone based on distracting driving conditions and Patent Owner argues a cellular phone is not a "telematic device," as claimed. *See, e.g.*, Pet. 39–40, 69–72; Resp. 40–43, 52–53.

We conclude that we need not expressly define the meaning of the claim term "telematic device" to render a final decision in this proceeding, but we do find that the '994 patent is unambiguous that the claim term includes within its scope a cellular telephone, as well as a variety of other devices. *See* Reply 3; *see, e.g.*, Ex. 1001, 5:47–58.

2. "communication"

The term "communication" appears in claims 1–7, 9, and 10. Ex. 1001, 22:42–24:58.

Patent Owner asserts, again without supporting argument or evidence, that this phrase should be understood to mean "a process by which information is exchanged by individuals through a common system of symbols, signs, or behavior." Resp. 18.

Petitioner argues that Patent Owner's proposed definition is not found in the intrinsic record and that it would be unreasonable for the claims to require the involvement of "individuals," i.e., humans, when the invention is directed to electronic communications (between components). Reply 6–7. Petitioner argues that the claim term "communication" does not require express construction and can be accorded its plain and ordinary meaning. *Id.*

We agree with Petitioner. Patent Owner's proposed construction does not appear to be applicable to the invention otherwise claimed and described

in the '994 patent; for example, "a controller in communication with [a] sensor," as recited by claim 1 would not involve any "individuals." In agreement with Petitioner, we decline to expressly construe the claim term.

3. *"communication device including at least a pager, a telephone, a global location sensor, a temporal sensor, an optical sensor, a heading sensor, a bearing sensor, and an altitude sensor"*

The language "communication device including at least a pager, a telephone, a global location sensor, a temporal sensor, an optical sensor, a heading sensor, a bearing sensor, and an altitude sensor" appears in claim 2. Ex. 1001, 23:1–26. Claims 7 and 8 depend from claim 2. *Id.* at 23:51–24:6.

As noted above, Petitioner asserts that this phrase is ambiguous and it is unclear whether the term "at least" means that the claim requires that *all* the subsequently listed devices are required, or that only *at least one* of them is required. Pet. 8–9. In view of this perceived ambiguity, Petitioner has asserted both Ground 1 and Ground 3, where the former asserts the Tan reference individually against claim 2 (and 7 and 8) in the case that only *one* of the listed devices is required, and the latter asserts Tan with Shuman and Behr against claim 2 (and 7 and 8) in the case that *all* of the listed devices are required. *Id.* We note, however, that Petitioner clarified at oral argument that "if you just read [the disputed language] in its plain and ordinary meaning, it's got to have all of them [the listed devices]. But really, it doesn't matter in this case because [Patent Owner] isn't arguing about these dependent claims" that include the disputed language. Hr'g Tr. 16:10–16.

Patent Owner asserts, again without any supporting argument or evidence, that this phrase should be understood to require "at least one" of the subsequently recited devices. Resp. 19. Patent Owner further argues,

insofar as Petitioner's position is that the claim language requires *all* of the listed components, that position is incorrect. *Id.*

We agree with Petitioner that the disputed claim language is, indeed, somewhat confusing. It appears to us from reading the language of claim 2 as a whole that Patent Owner understood that the phrase "include at least one of" could have been used rather than the language "including at least" because Patent Owner used these different phrases at different portions of claim 2. *Compare* Ex. 1001, 23:2, *with id.* at 23:14–15. Had Patent Owner intended that the disputed claim language require *only one* of the listed devices, it appears that Patent Owner understood how to claim that.

Further, the full disputed phrase of claim 2 recites a "communication device including at least a pager, a telephone, a global location sensor, a temporal sensor, an optical sensor, a heading sensor, a bearing sensor, and an altitude sensor." *Id.* at 23:14–17. However, adding to the ambiguity of the claim, this list of communication device *components* is tacked onto the end of a clause listing *software applications* (e.g., a telephone application and a wireless communication application), *not devices*. And, moreover, the term "communication device" is not preceded by an associated "a" or "the," and there is no other "communication device" recited earlier in claim 2 (or claim 1 from which it depends), which further adds to the claim's ambiguity.

Patent Owner asserts that "at least" means "at least one" and Petitioner, at least in an alternative argument, appears to potentially agree and presented a case for unpatentability based on such an interpretation. *See* Pet. 9 (compare Grounds 1 and 2 with Ground 3). Furthermore, following Patent Owner's stated position on this claim language in its Response (at page 19), Petitioner does not argue the matter in its Reply, other than stating

at one point (not at the claim construction section) that "at least" means "all." *See* Reply 1–7; *but see id.* at 14 (stating that the plain language of claim 2 requires all of the devices).

Thus, we could adopt Patent Owner's interpretation of claim 2's language where "communication device including *at least* a pager, a telephone, a global location sensor, a temporal sensor, an optical sensor, a heading sensor, a bearing sensor, and an altitude sensor" would be understood to require only *at least one of* the listed devices, e.g., just "a telephone." However, outright adoption of Patent Owner's proposed construction would require us to ignore the plain language of the claim, particularly in the context of the claim as a whole, and would appear to correct what, according to Patent Owner's position here, would amount to an error in the claim language that Patent Owner could have corrected by amendment, but did not.

We decline to adopt Patent Owner's proposed construction and accord the disputed claim language its plain meaning, which requires that that "[t]he safety control system" of claim 2 includes a "communication device including ***at least*** a pager, a telephone, a global location sensor, a temporal sensor, an optical sensor, a heading sensor, a bearing sensor, and an altitude sensor," i.e., all of these devices.

Ultimately, whether the claim language "at least" means that *at least one of* or *all of* the subsequently listed devices are included in the communication device is not determinative of the outcome here. *See Nidec Motor Corp.*, 868 F.3d at 1017 ("[W]e need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy.'"). This is because, as noted above and discussed in our analysis below,

Petitioner accounts for either proposed interpretation in asserting its Grounds 1 and 3, and we are persuaded by both grounds (e.g., if only one recited component is required, Tan teaches it; if all are required, the prior art combination teaches that). Patent Owner does not contest Ground 3 for any reasons different than those asserted against Ground 1 and, notably, does not dispute Ground 3 because the cited prior art fails to teach that *all* the listed devices would have obviously been included in a safety control system, as claimed. Accordingly, our ultimate determinations regarding the patentability of each challenged claim would have been the same had we adopted Patent Owner's proposed construction.

C. UNPATENTABILITY AND APPLICABLE LEGAL STANDARDS

"In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware*, 800 F.3d at 1378 (discussing the burden of proof in *inter partes* review).

Regarding obviousness, the Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), reaffirmed the framework for determining obviousness set forth in *Graham v. John Deere Co.*, 383 U.S. 1 (1966). The *KSR* Court summarized the four factual inquiries set forth in *Graham* (383 U.S. at 17–18) that are applied in determining whether a claim is unpatentable as obvious under 35 U.S.C. § 103(a) as follows: (1) determining the scope and content of the prior art; (2) ascertaining the

differences between the prior art and the claims at issue; (3) resolving the level of ordinary skill in the art;[9] and (4) considering objective evidence indicating obviousness or non-obviousness.[10] *KSR*, 550 U.S. at 406.

"The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 416. "[W]hen the question is whether a patent claiming the combination of elements of prior art is obvious," the answer depends on "whether the improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 417.

With these standards in mind, and in view of the definition of the ordinarily skilled artisan and our understanding of the asserted prior art, we address Petitioner's challenges below.

D. PETITIONER'S ASSERTED PRIOR ART

We review Petitioner's asserted prior art below.

1. Tan

Tan issued as U.S. Patent 6,574,531 on June 3, 2003, from U.S. Application 09/915,124, which was filed on July 25, 2001. Ex. 1025, codes (45), (21), (22). There is no dispute that Tan is prior art. *See generally* Resp.

Tan's Abstract summarizes its disclosed invention as follows:

> A vehicle computer system and method of providing information to an occupant of a vehicle that minimizes complete feature lock out are provided. The operating system of the computer is adapted to selectively display full and limited functionality versions of a particular screen, preferably

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[9] *See supra* Section II.A.

[10] There is no evidence pertaining to objective indicia of non-obviousness. *See generally* Resp.

> based on whether the vehicle is in motion. A text-to-speech engine can automatically generate audio based on a particular screen once motion is detected. The availability of a limited functionality version of the screen and audio, either independently or together, allow a vehicle occupant to retrieve information from the computer system without distraction.

Ex. 1025, Abstract.

Tan's Figures 2–4, reproduced below, illustrate this concept of limiting display and functionality of screen-enabled systems of a vehicle based on detecting vehicle motion:

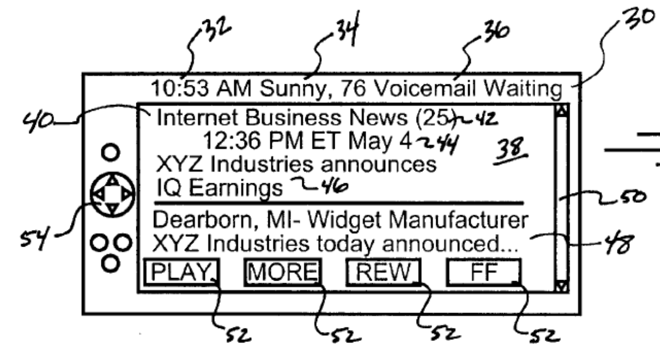

FIG. 2

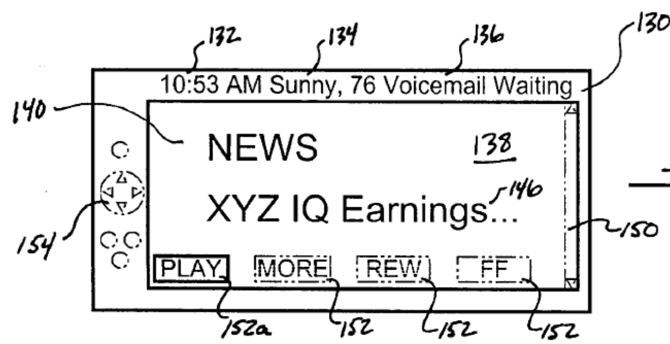

FIG. 3

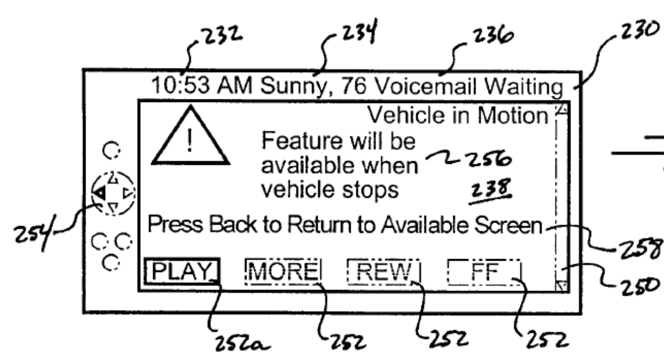

FIG. 4

Figures 2–4 show three views of a screen of a device in a vehicle. *See, e.g.*, *id.* at 1:43–62, 2:39–41, 4:13–15. Tan states that "FIG. 2 is a schematic view of a full functionality version of an Internet news screen in accordance with the present invention," "FIG. 3 is a schematic of a limited functionality version of an Internet news screen in accordance with the present invention," and "FIG. 4 is a schematic of a common screen in accordance with the present invention." *Id.* at 2:19–26. As these quoted portions of Tan indicate, Figures 2, 3, and 4 are three versions of the same in-vehicle computer system 10 having screen 14 for input (via touchscreen) and display, as well as hard buttons for input (*see also* Fig. 1), that illustrate decreasing degrees of information display and user-accessibility. *Id.* at 2:39–5:7.

Figure 2 shows a first, full functionality version 30 of the system where full information is displayed and full user access to all features and functions is provided. *Id.* at 4:10–33. Figure 2 shows that the device's display shows internet-derived news 40 (and details 42, 44, 46, 48), clock 32, weather summary 34, voicemail indicator 36, active scroll bar 50 for screen navigation, active touch buttons 52, and active directional navigator 54. *Id.*

Figure 3 shows a second, alternate, limited functionality version 130 of this system where some display information is maintained, e.g., clock 132, weather summary 134, and voicemail indicator 136; some other display information is modified to be abbreviated or truncated, e.g., internet news 140, with details omitted; and some functionality is unavailable, e.g., scroll

bar 150, touch buttons 152, navigator 154, while some remains available, e.g., play touchscreen button 152a. *Id.* at 4:35–60.

Figure 4 shows a third, less-functional, common screen 230 to which the system defaults when the limited functionality version shown in Figure 3 is unavailable. *Id.* at 4:61–5:7. The common screen 230 preferably includes notice 256 to inform the vehicle occupant that they have reached a point at which even limited functionality is not available; the notice states "Vehicle in Motion" and "Feature will be available when vehicle stops." *Id.* at 5:1–7, Fig. 4.

Tan discloses that its computer system includes electronics, such as a navigation system, internet connectivity, integrated mobile phone, and radio. *Id.* at 2:39–56, 3:13–36. Tan explains how its operating system functions to select the aforementioned versions of its display and functionality, as follows:

> [T]he operating system selectively chooses which version of the screen to display based on whether the vehicle is in motion. The operating system can receive data related to vehicle motion from a motion sensor placed appropriately in the vehicle, as described above. Based on this data, the operating system preferably chooses between the two alternate versions of the screen. In the preferred method, the operating system displays the full functionality version of the screen if the vehicle is not in motion, giving an occupant of the vehicle access to all information associated with the screen. However, if the vehicle is in motion, the operating system displays the limited functionality version of the screen. This method restricts the ability of a vehicle occupant to interact with the computer system, but avoids complete lock-out of features. Of course, the application and/or computer processor can select the appropriate screen based on vehicle motion, if appropriate.
>
> It is preferred that the sensor continually monitor for motion of the vehicle. This continuous monitoring allows the

> operating system to switch from the full functionality version of the screen to the limited functionality version as soon as vehicle motion is detected.

Id. at 5:16–38.

2. Boies

Boies issued as U.S. Patent 6,266,589 on July 24, 2001, from U.S. Application 09/443,388, which was filed on November 19, 1999. Ex. 1026, codes (45), (21), (22). There is no dispute that Boies is prior art. *See generally* Resp.

Boies summarizes its disclosed invention as:

> A motor vehicle safety system determines the state of automotive electronic devices as a function of speed to minimize potential distractions to the driver. Vehicle speed data is supplied to a rules based system which applies rules to determine what functions, at a given speed, within the respective electronic devices are available.

Ex. 1026, Abstract.

Boies illustrates such a system with a block diagram and a flowchart at Figures 1 and 2, which are reproduced below, side-by-side:

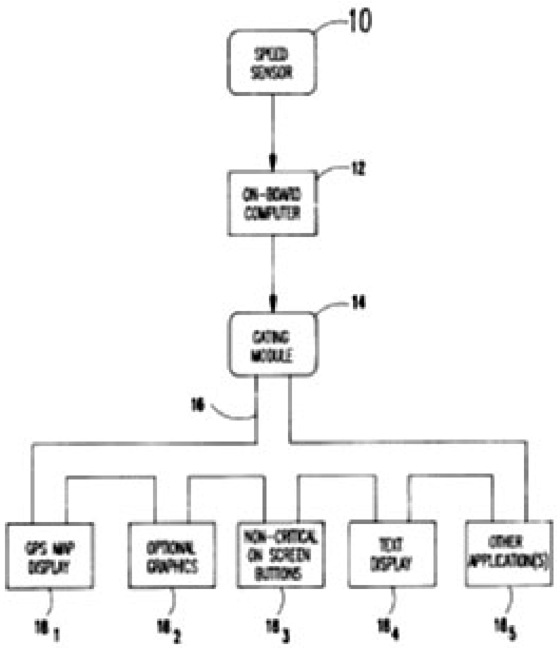

FIG. 1

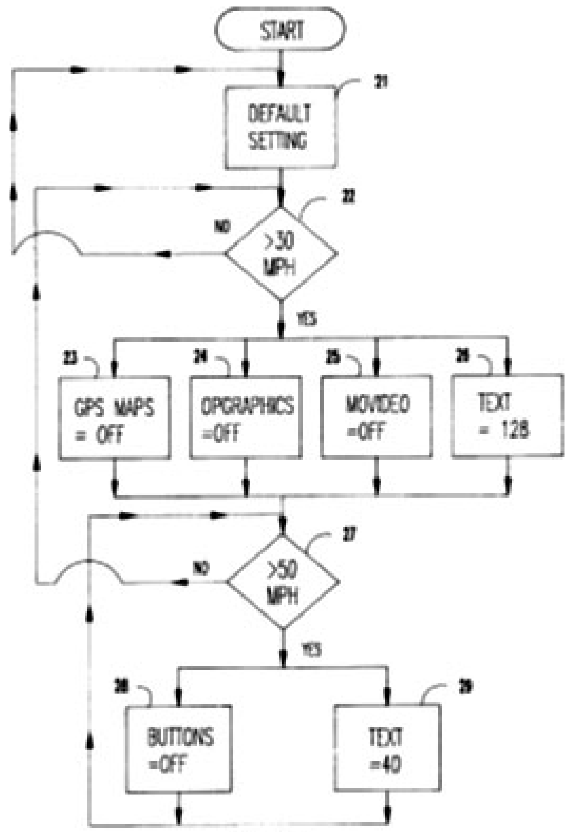

FIG. 2

Boies states that "FIG. 1 is a high level block diagram showing the basic components of a preferred embodiment of the invention; and FIG. 2 is a flow diagram showing the logic of the gating module of the system shown in FIG. 1." *Id.* at 1:59–62.

Figure 1 (above-left) shows the connections, data flow, and functionality control by and between vehicle speed sensor 10, on-board computer 12, gating module 14, and several electronic devices, including GPS map display 18_1, optional graphics 18_2, non-critical on screen buttons 18_3, text display 18_4, and other applications 18_5. *Id.* at 1:66–2:52. As "other applications," Boies discloses FM and internet radio, on-board cellular telephone, HVAC environmental controls, digital compass, and other

devices. *Id.* at 1:13–17, 3:31–4:14. Boies discloses that "the gating module 14 is a rule based system which determines the state, as a function of vehicle speed, of devices that may have potentially distracting functions" and that, "[f]or example, depending on the speed [of the vehicle], the gating module 14 may first determine whether particular electronic devices should be enabled or disabled and, if enabled, what portion of the full functionality can be provided to the driver as a function of automobile speed." *Id.* at 2:11–29.

Boies includes "[a]n example of the rules applied by the gating module 14 [a]s illustrated in the following pseudocode:"

```
If speed>30
    {
    GPSMaps=off;
    OptionalGraphics=off;
    MotionVideo=off;
    MaxText=128;
    }
If speed>50
    {
    Non-CriticalOnScreenButtons=off;
    MaxText=40;
    }
```

Id. at 2:37–52.

Figure 2 (prior page, above-right) shows how Boies system implements such pseudocode and illustrates that, once the vehicle is powered up:

> Vehicle speed is then monitored, preferably in real time, by gating module 14. A test is made in decision block 22 to

> determine if the speed is greater than 30 mph. If not, the process loops back to function block 21, where the default settings are maintained. If the speed exceeds 30 mph, the GPS map display flag is turned to "off" in function block 23, the optional graphics display flag is turned to "off" in function block 24, the motion video (if any) flag is turned to "off" in function block 25, and the maximum text displayed flag is turned to "128" in function block 26. Flags may contain multiple bits to allow for the setting of multiple values rather than simply on or off. Thus, for example, if the text function has a two bit flag and both bits are set to "1", then there may, for example, be no limitation to the text display. If one bit is set to "1" and the other bit set "0", then the text display, for example, may be limited to the information content of 128 bits (or some other appropriate value). If both bits are set, for example, to "0", then the text display is limited to the information content of 40 bits (or some other appropriate value).
>
> The next step in the process is to determine in decision block 27 whether the speed exceeds 50 mph. If not, the process loops back to decision block 22 to determine if the speed exceeds 30 mph, and the logic of decision block 22 is again executed, as discussed above. If the test in decision block 27 indicates that the speed exceeds 50 mph, the non-critical screen buttons flag is set to "off" in function block 28, and the maximum text displayed flag is set to "40" in function block 29. The process then loops back to decision block 22 to maintain this state until the speed drops below 50 mph. Upon detecting that the speed has decreased below the thresholds of 50 (as used in this example), the process loops back to decision block 22 to determine if the speed exceeds 30 mph, and the logic of decision block 22 is again executed, as discussed above.

Id. at 2:61–3:28. Thus, Boies discloses a sensed-speed-based control system that restricts or suppresses the functionality and display of several devices in a vehicle, where one level of suppression (none or default) is instituted at a first speed threshold, a second level of suppression (higher suppression) is

instituted at a second speed threshold, and a third level of suppression (highest or full suppression) is instituted at a third speed threshold. *Id.* Boies describes how these various levels of suppression may be instituted in devices such as a radio or a cellphone. *Id.* at 3:29–4:14.

3. Shuman

Shuman issued as U.S. Patent 6,161,071 on December 12, 2000, from U.S. Application 09/268,162, which was filed on March 12, 1999. Ex. 1029, codes [45], [21], [22]. There is no dispute that Shuman is prior art. *See generally* Resp.

Shuman summarizes its disclosed invention in its Abstract, as follows:

> A computing architecture for a motorized land-based vehicle is disclosed. The computing architecture includes a data network comprised of a plurality of interconnected processors, a first group of sensors responsive to environmental conditions around the vehicle, a second group of sensors responsive to the vehicle's hardware systems, and a map database containing data that represent geographic features in the geographic area around the vehicle. A vehicle-environment modeling program, executed on the data network, uses the outputs from the first and second groups of sensors and the map database to provide and continuously update a data model that represents the vehicle and the environmental around the vehicle, including geographic features, conditions, structures, objects and obstacles around the vehicle. Vehicle operations programming applications, executed on the data network, use the data model to determine desired vehicle operation in the context of the vehicle's environment. A driver interface receives the vehicle driver's input. Vehicle control programming, executed on the data network, receives outputs from the vehicle operations programming applications and the driver interface, determines a resolved operation for the vehicle's hardware systems and provides output commands indicative, thereof. The vehicle operations programming applications may include adaptive cruise control, automated mayday, and obstacle and collision

> warning systems, among, others. Also disclosed is a new computing architecture that organizes the applications and systems in the vehicle into two groups: driver assistance systems and mobile services and information systems. Also disclosed is a drive recorder that maintains records of the statuses of all vehicle systems and of the driver.

Ex. 1029, Abstract. Further discussing the "group of sensors" identified above, Shuman discloses that sensor devices 202 may include those sensing the vehicle's physical and geographic position, orientation, altitude, global positioning system information, gyroscopic information, road conditions such as moisture and traction, weather and meteorological conditions such as temperature, precipitation, barometric pressure, ambient and external light and visibility. *Id.* at 8:43–63.

4. Behr

Behr issued as U.S. Patent 5,808,566 on September 15, 1998, from U.S. Application 494,198, which was filed on June 23, 1995. Ex. 1012, codes [45], [21], [22]. There is no dispute that Behr is prior art. *See generally* Resp.

Behr summarizes its disclosed invention in its Abstract, which states, in part, "[t]he invention provides a method and system for providing route guidance and other information from a base unit to a remote unit in response to a request from the remote unit." Ex. 1012, Abstract. Behr explains that the "route guidance" may include information about roads as navigation instructions, that information communication may be by, for example, cellular telephone or radio frequency, and that the database of geographic data need not be "on-board." *Id.* at 3:29–30, 4:32–34, 5:16–27, 6:46–48.

Behr provides several examples of a "remote unit" for use in such a system, such as a computer, PDA (e.g., Apple Newton), and a pager, which

may be in a car, for example. *Id.* at 7:20–55, 11:6–9. Behr states that, "[i]n determining the route, the route calculator 66 preferably takes into account routing restrictions such as toll road avoidance, turn restrictions at a specified time of day, and other restrictions. Such routing restrictions may be specified by an operator at the base unit 12 in response to a temporary condition or may be added to the map database 72 when the restrictions become nationally available." *Id.* at 10:29–35.

5. Hardouin

Hardouin issued as U.S. Patent 6,311,078 on October 30, 2001, from U.S. Application 09/196,542, which was filed on November 20, 1998. Ex. 1027, codes (45), (21), (22). There is no dispute that Hardouin is prior art. *See generally* Resp.

The title of Hardouin is "Automatic Shutoff for Wireless Endpoints in Motion," and it summarizes its disclosed invention in its Abstract, as follows:

> A wireless telephone does not generate an alerting signal if the speed at which the wireless telephone is moving exceeds a predefined speed when an incoming call is received. If an alerting signal is not generated for an incoming call, the wireless telephone transmits a message back to the calling party informing them that they have contacted the wireless telephone and may leave either a voice or data message. The caller can then either leave a voice message or touch tone in the caller's telephone number. Further, the wireless telephone can inhibit the origination of calls from the wireless telephone if the speed of the wireless telephone exceeds the predefined speed. In addition, if the speed has not been equal or less than the predefined speed for a predefined amount of time, call originations and alerting signals are blocked.

Ex. 1027, code (54), Abstract. Hardouin explains that this system is for preventing driver distraction by a wireless telephone. *Id.* at 1:10–16, 1:24–46.

Hardouin discloses that a control unit of a wireless telephone detects speed, e.g., of an automobile in which the telephone is traveling, via a GPS device or via the automobile's speedometer. *Id.* at 1:57–2:15, Fig. 1. If the control unit determines that this speed is above some predefined speed it will control the telephone so as not to alert the user/driver via audio or vibration output and does not give the user/driver access to recorded information on the telephone or the ability to originate a call until the detected movement is detected to be at a rate below the predefined speed (e.g., 5 mph) for some predefined amount of time (e.g., 30 seconds). *Id.* at 2:4–38, Fig. 2.

E. PETITIONER'S PATENTABILITY CHALLENGES

As summarized above, Petitioner asserts four grounds for unpatentability of the claims of the '994 patent. *See supra* Section I.D; *see also* Pet. 2–3. We review Petitioner's challenges and Patent Owner's arguments below.

1. Obviousness of Claims 1, 3, 4, and 9 over Tan (Ground 1) and of Claims 2, 7, and 8 over Tan, Shuman, and Behr (Ground 3)

Petitioner's Ground 1 addresses independent claims 1 and 9, and dependent claims 2–4, 7, and 8, and asserts that each would have been obvious over Tan. *See* Pet. 9–36. Petitioner's Ground 3 asserts that dependent claims 2, 7, and 8 would have been obvious over Tan, Shuman, and Behr if we interpret claim 2's language to require a communication device including *each of* a telephone, a global location sensor, a temporal sensor, an optical sensor, a heading sensor, a bearing sensor, and an altitude sensor. *Id.* at 9, 60–69. Because each of Grounds 1 and 3 foundationally

relies on the same facts and arguments, because we interpret claim 2's contested language to require *each* of the listed devices, and because Patent Owner does not make separate arguments for these grounds, we address these grounds together. *See supra* Section II.B.3; *see* Resp. 19–38, 50–51.

Petitioner begins by discussing Tan and maps its disclosure to each limitation of independent claim 1. Pet. 13–27 (citing Ex. 1003 ¶¶ 95–100, 102, 128–132, 134–138; Ex. 1025, Abstract, 1:43–61, 2:39–3:4, 3:24–33, 4:4–9, 4:13–29, 4:34–49, 4:61–5:4, 5:16–32, Figs. 1–4).

Regarding claim 1's preamble and first clause limitation, 1.0 ("*A safety control system for vehicles comprising: a telematic device running at least one software application and having at least one input and at least one output*" (italics added here and below to highlight claim language)), Petitioner asserts that Tan teaches this in disclosing a vehicle computer system (having an integrated mobile phone) and method that displays full and limited functionality versions of an interactive display screen/device based on whether the vehicle is in motion. *Id.* at 13–16 (citing Ex. 1003 ¶¶ 128–132; Ex. 1025, Abstract, 2:39–3:4, 3:24–33, Fig. 1).

Turning to the next clause of claim 1, limitation 1.1 ("*at least one sensor operable to sense at least one condition related to a driving environment and data providing information indicating at least one distracting feature for at least one software application*"), Petitioner asserts that this is disclosed by Tan's motion sensors associated with the vehicle's axles, wheels, speedometer, parking brake, or other component of the vehicle indicating motion or lack of motion, and that motion or speed is an example of a condition of the driving environment (and a distracting feature) according to the '994 patent. *Id.* at 17–19 (citing Ex. 1001, 17:58–63,

23:59–24:6 (claim 8), Fig 5B; Ex. 1003 ¶¶ 134–139; Ex. 1025, Abstract, 1:43–61, 4:4–9, 5:16–32); *see also* Ex. 1001, 1:58–67, 3:51–63, 9:12–26, 14:14–27, Fig. 4 (identifying vehicle speed as a *distracting feature*). The language of Tan referring to vehicle *movement* and the language of the '994 patent referring to vehicle *speed* are not identical and identification of mere motion does not necessarily indicate a specific speed of a vehicle. However, this limitation does not expressly require speed sensing. Moreover, as we stated in our Institution Decision (*see* DI 26–27), sensing mere motion detects a vehicle's exceeding a 0 MPH speed threshold. *See also* Reply 7–10 (addressing this and confirming our understanding). Petitioner asserts Tan teaches using such vehicle movement data to determine how to control and limit the functionality of the aforementioned screen/device. Pet. 19 (citing Ex. 1003 ¶ 139; Ex. 1025, Abstract, 1:43–61, 5:16–32).

Regarding limitation 1.2 ("*a controller in communication with the sensor and the data and the software application and the telematic device, the controller configured to prevent the at least one application output from being provided to the driver in the original format of the at least one output and to provide the at least one output to the driver in a different format*"), Petitioner asserts that Tan teaches this in disclosing a vehicle computer system and its operating system running a computer application to control a computer processor and electronics that control the visual interface of the application program and, thus, the telematic device (computer system with screen and phone) in the vehicle. *Id.* at 20–24 (citing Ex. 1003 ¶¶ 141–144, 146, 148–151; Ex. 1025, 1:43–62, 3:24–27, 3:37–55, 4:35–60, 5:18–32, Figs. 2–3). Petitioner asserts that, in response to sensed motion (speed greater than 0 MPH) information relayed to the computer system, Tan's

computer system regulates the screen display and functionality from a first format allowing full display and functionality to a second format providing more limited display and functionality. *Id.*

Turning to the final clause of claim 1, limitation 1.3 ("*wherein the controller controls when at least one input into the software application and at least one output from the software application are provided to the driver so that prior to permitting the driver to access the input or prior to providing an output from the software application on the telematic device to the driver, the controller determines whether said at least one condition is within a threshold and permits the driver to access said input or provides said output to said driver only when said at least one condition is within the threshold*"), Petitioner asserts that the aforementioned computer system of Tan meets these elements in that it prevents certain outputs from and inputs to the system when the vehicle is in motion; for example, when a sensor detects the vehicle exceeds a speed of 0 MPH (the ordinarily skilled artisan would know this could be set to any desired speed value as evidenced by Boies (Ex. 1026, 2:53–3:28, Fig. 2)) the display screen transitions to a more limited display of information and user interactability with the device is limited. Pet. 25–27 (citing Ex. 1003 ¶¶ 152–156; Ex. 1025, 1:42–61, 4:39–60, 5:18–32, Figs. 2–3).

In view of the above-discussed assertions by Petitioner and the related evidence of record, Petitioner has accounted for all elements of claim 1 in Tan's disclosure by a preponderance of evidence. We agree with Petitioner that Tan teaches the safety control system of claim 1 and renders claim 1 obvious. We address Patent Owner's arguments to the contrary and why they are not persuasive below. We do not necessarily address issues not in

dispute. *See In re NuVasive, Inc.*, 841 F.3d 966, 974 (Fed. Cir. 2016) ("The Board [is] not required to address undisputed matters."); *see also* Paper 12, 10 (Scheduling Order emphasizing that "any arguments not raised in the response may be deemed waived").

Patent Owner makes an argument that Petitioner's Ground 1 is premised on obviousness over Tan, but that Petitioner's rationale for obviousness incorporates, generally, the knowledge the ordinarily skilled artisan would have had at the time and also relies upon the disclosure of Boies for its teaching that it would have been obvious to the ordinarily skilled artisan to use any detected speed as a threshold for motion triggering the throttling of the telematic device of Tan. Resp. 19. Patent Owner's argument is that this forecloses Petitioner's ground over Tan alone. Relatedly, Patent Owner argues that Tan's disclosure of sensing vehicle motion does not teach the claim element of sensing "speed within a certain threshold range," and that Petitioner relied on impermissible hindsight. *See id.* at 20–22, 28–38. Such arguments are not persuasive.

As an initial matter, all obviousness patentability analyses require consideration of the invention and prior art from the perspective of the person of ordinary skill in the art, meaning such a hypothetical person's knowledge is always considered. *See KSR*, 550 U.S. at 418 (one must consider "the background knowledge possessed by a person having ordinary skill in the art"). Thus, under Ground 1, Petitioner does not seek to *combine* the teachings of Tan and Boies, but cites Boies as *evidence* for how the ordinarily skilled artisan would have read and understood Tan, that is, as evidence of what type of knowledge such a person would have brought to the table as of the date of invention. Pet. 25–27. Petitioner asserts that

Boies evidences that the ordinarily skilled artisan would have read Tan's disclosure of sensing vehicle motion and understood that, as Tan teaches sensing such motion by accessing, for example, the speedometer (*see id.* at 17 (citing Ex. 1025, 4:4–9)), any value for the motion threshold would have been obvious, e.g., greater than 0 MPH, greater than 30 MPH, greater than 50 MPH. *Id.*; *see also* Hr'g Tr. 20:7–16 (confirming our understanding that Petitioner did not seek to combine Boies with Tan or require any teachings of Boies under Ground 1, but that Boies was set forth as an evidentiary example of what an ordinarily skilled artisan would have known when reading Tan).

Regarding Patent Owner's related argument that Tan's disclosure of motion sensing does not render obvious the claimed "*controller determines whether said at least one condition is within a threshold*," we disagree. As we noted above, Petitioner's position is that Tan's disclosure of sensing any motion and then restricting its telematic device's output and functionality indicates Tan's speed threshold of 0 MPH as a condition determined by its system. No speed threshold is excluded by the claim, even a low threshold speed like above 0 MPH. And, even were there some limit on such a threshold, we also agree with Petitioner's point that the ordinarily skilled artisan would have also found it obvious to use any given speed, as indicated by a speedometer, as a potentially distracting condition for Tan's motion detection. *See* Ex. 1003 ¶ 156 (Mr. Andrews testifying to this fact); *see also* Hr'g Tr. 14:19–24 (clarifying Petitioner's position on such a threshold), 41:13–18 (Patent Owner explaining, "If I'm at ten miles an hour, there's a certain amount of danger. But if I'm at 70 miles an hour, it's even more dangerous. If I put it at zero, it is the maximum safety because whenever the

vehicle's moving it shuts off, and that's what Tan teaches"—Patent Owner thereby conceding agreement with our analysis that Tan's motion sensing is sensing of a speed threshold, albeit the lowest one, for "maximum safety").

Patent Owner also argues that Tan "specifically teaches away from using a speed sensor in favor of a motion sensor and thus teaches away from using speed data as opposed to motion indication." Resp. 21. We disagree.

Tan does not teach away from considering or sensing speed data, or from the "*controller determines whether said at least one condition is within a threshold*," of claim 1. "[A] reference will teach away when it suggests that the developments flowing from its disclosures are unlikely to produce the objective of the applicant's invention," or "when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *Syntex (U.S.A.) LLC v. Apotex, Inc.*, 407 F.3d 1371, 1380 (Fed. Cir. 2005); *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). Nothing about Tan criticizes, discredits, or otherwise discourages anything about the claimed invention and certainly not using speed as a threshold condition rather than mere motion. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). Tan does not teach away, as argued by Patent Owner, in fact, quite the opposite as we have addressed above. Tan teaches that sensing vehicle motion is accomplished by sensing vehicle speed in disclosing that its motion sensor is "preferably associated with the . . . speedometer . . . of the vehicle." *See* Ex. 1025, 4:4–9.

Moreover, the Petition relies solely on evidence from the prior art, and we determine that no hindsight was improperly relied upon in Petitioner's obviousness assertions based on Tan. *See In re McLaughlin*, 443 F.2d 1392,

1395 (CCPA 1971) ("Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper.").

Patent Owner also argues that Tan's motion sensing "does not teach the acquisition and use of speed data" and that claim limitation 1.1 requires "a sensor that, based on Plain and Ordinary meaning, senses at least two different pieces of information": (1) a condition of the driving environment such as whether the vehicle is in motion; and (2) data about that condition, such as speed. Resp. 22–23 (citing Ex. 2027 ¶¶ 54–56). Relating to this, Patent Owner discusses and cites the '994 patent's Figures 4 and 5 and, generally, argues that the claimed invention is what is shown in these figures, which disclose sensing a variety of conditions, in a specific order, and that whether some conditions are sensed at all depends on whether a preceding condition was or was not sensed. *Id.* at 23–26; *see also supra* Section II.D.1 (discussing Tan and these figures). We are not persuaded.

As we noted above, Tan's disclosure of sensing motion of a vehicle, e.g., with a sensor accessing the speedometer, and of a computer system that uses the sensed data to regulate the output and functionality of a telematic device, renders obvious the claim limitations 1.1 and 1.3 relating to, *inter alia*, "*at least one sensor operable to sense at least one condition related to a driving environment and data providing information indicating at least one distracting feature for at least one software application*" and "*the controller determines whether said at least one condition is within a threshold and permits the driver to access said input or provides said output*

to said driver only when said at least one condition is within the threshold." *See* Pet. 17–19, 25–27; *see also* Ex. 1003 ¶¶ 134–139, 152–156.

Claim 1 of the '994 patent does not restrict the sensed driving environment condition to any specific condition, much less a series of specific conditions (like Fig. 4 of the '94 patent), and the '994 patent describes vehicle speed as one driving condition that may be sensed. *See supra* Section I.C (discussing the disclosure of the '994 patent). We find Tan's disclosure of sensing vehicle motion renders the claim limitations obvious, as asserted by Petitioner. Here, we will not limit the claims to one preferred embodiment of the written description absent a reason to do so. *Bayer AG v. Biovail Corp.*, 279 F.3d 1340, 1348 (Fed. Cir. 2002) ("[E]xtraneous limitations cannot be read into the claims from the specification or prosecution history. . . . In other words, a court may not read into a claim a limitation from a preferred embodiment, if that limitation is not present in the claim itself."); *see also In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004) ("Absent claim language carrying a narrow meaning, the PTO should only limit the claim based on the specification or prosecution history when those sources expressly disclaim the broader definition.").

We recognize that several paragraphs of testimony from Mr. Peck's Declaration are cited by Patent Owner as support for its argument that Tan's motion detection is insufficient. *See* Ex. 2027 ¶¶ 67–77. Mr. Peck's testimony relies on the premise that mere motion detection does not equate to speed detection and, thus, cannot satisfy claims that require a threshold. However, as we state above, we agree with Petitioner, and its declarant, that Tan's disclosure of sensing of any vehicle motion teaches detecting speed exceeding a threshold of 0 MPH. We find this sufficient to render the

relevant claimed subject matter obvious even without considering the fact that the ordinarily skilled artisan would have also found it obvious to use any speed threshold for this sensing and device control, which the evidence also supports (*see* cites to Boies note above). *See* Ex. 1003, ¶ 156 (Mr. Andrews testifying that "any pre-defined speed at which the system takes action is a threshold speed," "[a]n ordinary artisan would also have understood that the speed threshold could be set to whatever value the designer felt was appropriate," and "[a]n ordinary artisan would have readily understood that the speed threshold in Tan (e.g. >0 MPH) is a configurable and flexible value that, as described in both Tan and Boies, can be used to limit information and functionality presented to the driver.").

Patent Owner also argues that "[b]ecause *Tan* fails to show the sensor element from 1.1 above, it also fails to show the controller in communication with the sensor, the data, the software application and the telematic device as required by element 1.2." Resp. 27–28 (citing Ex. 2027 ¶ 66). This argument is foundationally premised on Patent Owner's arguments addressed above. Because those are unpersuasive, so is this argument.

Patent Owner presents no other arguments over claim 1 and Ground 1. As already stated, we are persuaded by Petitioner's positions and evidence, and find that Petitioner has shown by a preponderance of evidence that claim 1 is obvious over Tan. We now turn to the other claims challenged under Ground 1.

Regarding claims 2–4 and 7–9, Petitioner similarly discusses how Tan teaches the recited subject matter and maps its disclosure to each claim element. *Id.* at 27–36 (citing, *inter alia*, Ex. 1003 ¶¶ 85–87, 128–139, 141–

162, 165–169, 171–175, 177–179, 181–184, 186–190; Ex. 1025, Abstract, 1:46–61, 2:39–56, 3:13–55, 4:4–60, 5:16–32, Figs. 2, 3, 4). Patent Owner does not address these assertions or the patentability of these claims under Ground 1 in any way other than having made the arguments over claim 1 discussed above. *See id.* at 38 ("Dependent claims 2–8 are therefore patentable for at least the same reasons, and no further discussion of additional reasons for patentability is deemed necessary" and "Patent Owner agrees with Petitioner that claim elements 9.1-9.3 are similar enough to claim element[s] 1.1-1.3 discussed above that those same reasons given above with respect to claim 1 demonstrate why claim 9 is patentable over the theories propounded in the Petition."); *see also* Hr'g Tr. 12:3–8 (pointing out the lack of argument on dependent claims).

Regarding claim 2 (and claims 7 and 8 that depend therefrom), as we noted above (*see supra* Section II.B.3), under Ground 1 Petitioner asserts obviousness over Tan alone under the assumption that the phrase "at least" in the claim means at *least one of*. We find that this language does not mean *at least one of*, but that its plain meaning grammatically requires that *each* of the subsequently listed devices must be included. *Id.* For this reason, we discuss the patentability of claim 2 (and 7 and 8, below) in view of Petitioner's Ground 3. However, as noted above, even were we to adopt Patent Owner's proposed claim construction, as discussed, Tan teaches *at least one* of the listed devices (e.g., a telephone or global location sensor) and would, therefore, render the claim obvious without combination with other prior art.

Petitioner asserts that Tan renders obvious the claimed "*software applications*" of claim 2 (limitation 2.0) by disclosing its vehicle computer

system runs various types of computer programs, which are suitable for use with radios, mobile phones, personal computers, as well as disclosing an internet news application and a wireless communications application, where only one of the foregoing ("*at least one of*") is required by the claim limitation. Pet. 61 (citing Ex. 1003 ¶¶ 253–257; Ex. 1025, 2:44–46, 3:19–22, 3:24–32, 4:10–20). Petitioner asserts that the combination of Tan, Shuman, and Behr renders obvious the claimed "*communication device*" (limitation 2.1) including all the listed devices because Tan discloses telephones, navigation computers, hardware with optical sensors, GPS receivers with satellite signal sensors with clocks, heading sensors, and speed sensors; Shuman discloses GPS like Tan's that senses heading, altitude, and bearing, and an external light sensor with optical capabilities; and Behr discloses GPS that determines a route based on routing restrictions and time of day (temporal sensor), and a pager. *Id.* at 61–65 (citing Ex. 1003 ¶¶ 68–74, 259–263; Ex. 1012, 8:46–55, 10:29–32; Ex. 1013, 63–70; Ex. 1025, 2:41–50, 3:14–19; Ex. 1029, 8:43–49, 8:53–61). Petitioner also asserts that the "*at least one sensor*" limitation (2.2) is taught by Tan in disclosing a sensor that senses vehicle speed and movement, as discussed above for limitation 1.1. *Id.* at 66 (citing Ex. 1003 ¶¶ 168, 267–268; Ex. 1025, 4:4–9, 5:16–20). Finally, Petitioner asserts that limitation 2.3 ("*controller prevents . . . original format . . . and provides said at least one output . . . in a different format*") is obvious over Tan's disclosure of reformatting its display if the vehicle is sensed to be moving, as with limitation 1.2, discussed above. *Id.* at 67 (citing Ex. 1003 ¶¶ 169, 269–270; Ex. 1025, 1:46–61, 4:39–60, 5:18–32, Figs. 2, 3).

Petitioner asserts that it would have been obvious to the ordinarily skilled artisan to combine Shuman with Tan because Shuman's teachings on its GPS would illuminate the capabilities of and data provided by Tan's GPS; these are the same or similar devices and may have the same or similar capabilities. *Id.* at 63 (citing Ex. 1003 ¶ 261). Petitioner asserts that it would have been obvious to the ordinarily skilled artisan to also combine Behr with Tan because Behr's disclosure of monitoring the time of day to ensure its GPS provides relevant, safe, and legal instructions would also similarly support Tan's GPS functioning, and also because there would have been a benefit to including Behr's pager's functionality in Tan's system because such was a relevant communication technology. *Id.* at 64–65 (citing Ex. 1003 ¶¶ 263, 265).

We agree with Petitioner's assertions and reasoning regarding combining these prior art references with a reasonable expectation of success, and Patent Owner does not argue otherwise. *See generally* Resp.

Regarding claim 3 ("*the controller resides on at least one of portable multifunction telematic device, a built in telematic controller or a remote controller in communication with the vehicle, the driver, the software application, the input and the output to the driver*"), which depends from independent claim 1, Petitioner asserts that Tan renders the claimed elements obvious in disclosing its vehicle computer system 10 can take the form of a radio, an integrated mobile phone, or an integrated personal computer, which would include the computer and software that controls the output/functionality of the system respective of the driver. Pet. 30–31 (citing Ex. 1003 ¶¶ 171–175; Ex. 1025, 2:39–56, 3:14–55, 4:4–9).

Petitioner asserts that claim 4 ("*the software application resides on at least one of portable multifunction telematic device, a built in telematic controller or a remote controller in communication with the vehicle the driver, the software application, the input and the output to the driver*"), which depends from independent claim 1, would have been obvious over Tan because the reference discloses the vehicle computer system 10 can be a built-in telematic device with the controller for the system's output/functionality. *Id.* at 32–33 (citing Ex. 1003 ¶¶ 177–179; Ex. 1025, 2:39–56, 3:24–25, 3:37–38, 4:10–60, Figs. 2–4).

Regarding claim 7 ("*the data indicating at least one distracting feature resides on at least one or more of a portable multifunction telematic device a built in telematic controller or a remote controller in communication with the vehicle, the driver, the software application, the input and the output to the driver, whereas such communication is carried out wirelessly via LAN, WAN, Cellular or WIFI*"), which depends from claim 2 (addressed above), Petitioner asserts that it is obvious because Tan discloses its vehicle computer system's operating system receives data on vehicle motion to determine the output and functionality of the telematic device display, and because Tan discloses wireless communications with external networks. *Id.* at 67–68 (citing Ex. 1003 ¶¶ 181–184, 274–275; Ex. 1025, 3:19–23, 5:18–32).

As for claim 8 ("*the driving environment data provided to the system includes at least one of a vehicle data, traffic data, driver related data, applications in use data, other vehicles in traffic data, GPS data, location data, heading data, bearing data, navigation data, passengers data, pedestrian data, weather data, infrastructure data, location data and*

temporal data related to the driving environment”), which also depends from claim 2, Petitioner asserts it is obvious because Tan discloses GPS data and vehicle speed/movement data is indicative of the driving environment, as discussed above concerning limitation 1.1. *Id.* at 68–69 (citing Ex. 1003 ¶¶ 186, 277; Ex. 1025, Abstract, 3:13–22, 4:4–9, 5:16–20).

Regarding independent claim 9, Petitioner asserts it is "substantially identical" to claim 1, with no patentably distinct subject matter recited compared to claim 1. *Id.* at 34–36. Thus, Petitioner cites the same evidence and asserts claim 9 would have been obvious over Tan for the same reasons as for claim 1. *Id.* (citing Ex. 1003 ¶¶ 128–139, 141–157, 187–190). As noted above, Patent Owner agrees that claims 1 and 9 are substantially identical, or at least "similar enough" that their patentability stands or falls together. Resp. 38.

As with independent claim 1, we find Petitioner has established by a preponderance of the evidence that claims 3, 4, and 9 are obvious over Tan. Furthermore, we also find Petitioner has established by a preponderance of the evidence that claims 2, 7, and 8 are obvious over Tan, Shuman, and Behr. To summarize, we agree with Petitioner that each of claims 1–4 and 7–9 is obvious under Grounds 1 or 3, as discussed above.

2. Obviousness of Claims 1, 3, 4, and 9 over Boies (Ground 2)

Under Ground 2, Petitioner asserts that the ’994 patent’s claims 1–4 and 7–9 would have been obvious over Boies. Pet. 36–60. Petitioner begins with independent claim 1 and addresses how Boies teaches each limitation thereof. *Id.* at 36–49 (citing Ex. 1003 ¶¶ 104–107, 191–198, 200–207, 209–215, 217–222; Ex. 1026, Abstract, 1:12–19, 1:35–42, 2:5–3:24, 4:4–14, Figs. 1, 2).

Regarding claim 1's limitation 1.0 ("*A safety control system for vehicles comprising: a telematic device running at least one software application and having at least one input and at least one output*"), Petitioner asserts it is taught by Boies's disclosure of its own motor vehicle safety system, which includes an on-board computer and software that determines the state of the vehicle's electronic devices as a function of speed to minimize driver distractions, including the functioning of, for example, a GPS and a cellular phone, which are telematic devices having output and user input. Pet. 36–42 (citing Ex. 1001, 16:58–59 (a telephone is a telematic device); Ex. 1003 ¶¶ 104–107, 191–198; Ex. 1026, Abstract, 1:12–19, 2:5–3:13, 4:4–14, Figs. 1, 2).

Turning to claim 1's limitation 1.1 ("*at least one sensor operable to sense at least one condition related to a driving environment and data providing information indicating at least one distracting feature for at least one software application*"), Petitioner asserts this is taught by Boies in disclosing a speed sensor 10 that provides data to the on-board computer on vehicle speed as a distracting condition/feature (which the computer uses to determine whether to limit system functionality). *Id.* at 42–43 (citing Ex. 1001, 17:58–63, Fig. 5b, claim 8 (identifying vehicle speed as a distracting vehicle condition); Ex. 1003 ¶¶ 200–207; Ex. 1026, Abstract, 1:35–42, 2:6–11, 2:24–52, 4:4–14).

Regarding limitation 1.2 ("*a controller in communication with the sensor and the data and the software application and the telematic device, the controller configured to prevent the at least one application output from being provided to the driver in the original format of the at least one output and to provide the at least one output to the driver in a different format*"),

Petitioner asserts this is taught by Boies in disclosing an on-board computer and a gating module in communication with a speed sensor, where "the gating module uses speed information from the on-board computer to function as a controller and prevent an output from a GPS mapping system [and cellular phone], and instead provide that output in a different format." *Id.* at 44–46 (citing Ex. 1003 ¶¶ 209–215; Ex. 1026, 2:17–20, 2:24–36, 4:4–13, Fig. 2).

Finally, regarding claim 1's limitation 1.3 ("*wherein the controller controls when at least one input into the software application and at least one output from the software application are provided to the driver so that prior to permitting the driver to access the input or prior to providing an output from the software application on the telematic device to the driver, the controller determines whether said at least one condition is within a threshold and permits the driver to access said input or provides said output to said driver only when said at least one condition is within the threshold*"), Petitioner asserts that it is taught by Boies because the reference discloses controlling the functionality of the vehicle's GPS and cellular phone (as noted above) to enable or disable functions based on vehicle speed data, for example, if the vehicle is traveling above 30 MPH certain output and input functionality is permitted and if the vehicle is traveling above 50 MPH less output and input functionality is permitted. *Id.* at 47–49 (citing Ex. 1003 ¶¶ 217–222; Ex. 1026, 2:62–3:4, 3:14–22, 4:4–13, Fig. 2).

In view of the above-discussed assertions by Petitioner and the related evidence of record, Petitioner has accounted for all elements of claim 1 in Boies's disclosure by a preponderance of evidence. We agree with Petitioner that Boies teaches the safety control system of claim 1 so as to

render it obvious. We address Patent Owner's arguments to the contrary and why they are not persuasive below. We do not necessarily address issues not in dispute. *See In re NuVasive, Inc.*, 841 F.3d at 974.

Patent Owner first argues that Petitioner waived arguments over Boies alone because Petitioner indicated that a determination of obviousness "requires additional features from supplemental sources such as from the knowledge of skilled artisans." Resp. 38–39. This is not a persuasive argument. We do not agree that Petitioner admits that Boies does not suggest all of the features of claim 1. Rather, we read the Petition as taking the position that the person of ordinary skill in the art would have had some knowledge applicable to a reading of Boies. As we noted above, all obviousness patentability analyses require consideration of the invention and prior art from the perspective of the person of ordinary skill in the art, meaning such a hypothetical person's knowledge is always considered. *See KSR*, 550 U.S. at 418 (one must consider "the background knowledge possessed by a person having ordinary skill in the art").

Patent Owner argues that Boies fails to teach a "telematic device," based on its proposed definition thereof, which we have not adopted. Resp. 40; *see supra* Section II.B.1. Patent Owner argues that a "telematic device" must provide multiple applications, like navigation, phone interface, internet access, radio, and vehicle status. Resp. 41. Patent Owner states that "the parties seem to be in agreement regarding the computing platforms that qualify as a telematic device including computers, PDAs and cell phones and the like." *Id.* at 42 (citing Pet. 15). But, Patent Owner argues that in the 1990s and early 2000s mobile phones performed only one function—making

wireless calls. *Id.* at 42–43. Patent Owner argues that a "telematic device" must be a multi-function, integrated device. *Id.* at 44–46.

At oral argument, Patent Owner clarified its position on "telematic device" and the disclosures of Boies (and Hardouin), that, in the mid-1990s when Boies was published, the cellular phones would have been "single-function phones," not "multi-function devices" that qualify as telematic devices. *See* Hr'g Tr. 44:1–15. Patent Owner took the position at oral argument that the written description of the '994 patent requires its disclosed cellular phone to have internet accessing capabilities, thereby qualifying as a telematic device, and that the meaning of the term in the claims should reflect this requirement.

These arguments are not persuasive.

Although Patent Owner identifies where the Specification discusses "a multifunction device," Patent Owner has not shown how the Specification supports its position that these teachings limit the meaning of "telematic device." We disagree with the position, and we decline to read Patent Owner's proffered limitation into the claims. *See generally* Resp.; Hr'g Tr. As we determined above (*supra* Section II.B.1), the scope of the claim term "telematic device" includes a cellular telephone, as well as a variety of other devices, none of which are limited in the fashion proposed by Patent Owner.

In any event, the '994 patent does not go into any detail on the capabilities of its disclosed cellular phone telematic device, e.g., it does not explain that it can necessarily access the internet. *See generally* Ex. 1001. Any argument that the cellphones of the prior art and the phones of the '994 patent were, for some reason, different as of the date of the invention is meritless as neither the '994 patent nor the prior art qualifies the capabilities

of their mobile phones in any way. *See* Hr'g Tr. 63:17–66:7 (the Panel specifically inquired of Patent Owner why the prior art's mobile phones would have been understood to be different than the cellular phone of the '994 patent as of its filing date, but no persuasive reason could be provided; however, Patent Owner conceded that as of the '994 patent's filing date "someone seeing the word [cellular] phone in a patent would understand that's a telematic device."). *KSR*, 550 U.S. at 399 (obviousness is analyzed as of the time the invention was made, i.e., the effective filing date); *Graham*, 383 U.S. 691–92 (quoting § 103: "A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention"). Thus, Patent Owner's arguments are unpersuasive.

Patent Owner's next argument is that Boies fails to teach limitation 1.2 in that the reference has no *controller in communication with a sensor* because Boies's gating module is not in communication with Boies's sensor and Boies's on-board computer is an intervening device that receives a "speed signal" from the "speed sensor" and supplies an output of "data representing the speed of the vehicle" to the gating module. Resp. 45–47 (citing Ex. 2027 ¶¶ 92–96; Ex. 1026, 2:5–12, Fig. 1). Patent Owner argues at length that the data output by the sensor is not usable by the gating module without the intervening computer transforming it. *Id.* at 47–49 (citing Ex. 2027 ¶¶ 97–100). Patent Owner also argues that, based on its proposed claim construction of "communication," there is no information exchanged by individuals in Boies. *Id.* at 49–50; *see supra* Section I.B.2.

Patent Owner's arguments are not persuasive. At the outset we note we have not adopted Patent Owner's interpretation that claim 1 requires communication between individuals. The fact that Boies's disclosure includes a computer along the communication line between a speed sensor and a gating module does not demonstrate that the sensor and gating module (the claimed controller) are not in communication. The claim does not recite that the controller and sensor must be in direct communication; it only requires that they be "in communication." Ex. 1001, 22:50. Moreover, at oral argument Patent Owner agreed that the claimed communication between claimed *sensor* and *controller* (limitation 1.2) need not be direct communication. Hr'g Tr. 51:3–6 ("JUDGE FLAX: So on this term, are you saying that it has to be direct communication? MR. SHANAHAN: No, Your Honor. That's why we have a supplemental declaration. Our expert never said that.").

Boies is quite clear that the gating module functions to control the functioning of the GPS or on-board cellular telephone when vehicle speed data is supplied to the rules based system of the gating module, that the speed data is generated by the speed sensor to the onboard computer, and that the speed data is then output as representational data to the gating module so that "[v]ehicle speed is then monitored, preferably in real time, by gating module 14." Ex. 1026, 1:26–4:14, Fig. 1. Mr. Andrews's testimony on this is that both Boies's on-board computer and gating module are in communication with its speed sensor in this way. Ex. 1003 ¶ 209; *see also* Ex. 1039 ¶¶ 18, 27, 29, 35–37; Reply 11–13. We agree—absent such communication between the sensor and the gating module, the gating module could not function to regulate the functionality and output of Boies's

GPS or cellular phone based on speed. *See* Ex. 1003 ¶¶ 210–215; *see also* Ex. 1026, 1:26–4:14, Fig. 1 (disclosing such communication and functioning).

Patent Owner presents no other arguments over claim 1 and Ground 2. As stated above, we are persuaded by Petitioner's positions and evidence that claim 1 is obvious over Boies. We now turn to the other claims challenged under Ground 2.

Patent Owner does not address Petitioner's assertions or the patentability of these claims under Ground 2 in any way other than the arguments over claim 1 discussed above. *See* Resp. 50 ("Dependent claims 2-4 and 7-9 are therefore patentable over *Boies* for at least the same reasons claim 1 is patentable over *Boies*. EX. 2027, ¶ 103" and "Patent Owner agrees with Petitioner that claim elements 9.0 and 9.2 are similar enough to claim elements 1.0 and 1.2 discussed above that those same reasons given above demonstrate why claim 9 elements 9.0 and 9.2 are patentable over the theories propounded with respect to claim 1. See Petition at 58-60. Accordingly, claim 9 is patentable over the positions provided by Petitioner for the same reasons claim 1 is patentable. EX. 2027, ¶ 104.").

Regarding dependent claims 2, 7, and 8, Petitioner states, "[i]n this Ground 2, Petitioner applies [Patent Owner's] apparent claim construction that the 'communication device' includes 'at least ***one of***' of the devices recited in limitation [2.1] – *not* 'each' of the recited devices." Pet. 52. We have not adopted this interpretation of the disputed claim language. *See supra* Section II.B.3. For this reason, and because we have already found and explained above that claims 2, 7, and 8 are proven by a preponderance of the evidence to be obvious over Tan, Shuman, and Behr under Ground 3,

we will not address dependent claims 2, 7, and 8 under Ground 2 other than to acknowledge that Petitioner did not assert the correct claim construction for this challenge.

Regarding dependent claim 3, Petitioner asserts that Boies renders it obvious by disclosing a vehicle safety system is used to control a GPS and on-board cellular phone, each of which Petitioner asserts would have been obvious to be a built-in or portable device based on the ordinarily skilled artisan's reading of Boies. Pet. 54–55 (citing Ex. 1003 ¶¶ 235–236; Ex. 1026, 2:24–3:4, 4:4–14).

Petitioner asserts that Boies renders dependent claim 4 obvious because the reference discloses "pseudocode" representing software run by the system (e.g., the GPS or on-board cellular telephone, which, as noted, can be built-in or portable) so that such a system is functionally regulated based on the afore-discussed sensor input. *Id.* at 55–56 (citing Ex. 1003 ¶¶ 238–241; Ex. 1026, 2:37–3:13, 3:29–31, 4:4–14).

Regarding independent claim 9, Petitioner asserts it is "substantially identical" to independent claim 1 and that the same evidence supports its obviousness. *Id.* at 58–60 (citing, *inter alia*, Ex. 1003 ¶¶ 191–223, 246–249). As noted above, Patent Owner agrees on the similarities between claims 9 and 1. Resp. 50.

As with independent claim 1, we find Petitioner has established by a preponderance of the evidence that claims 3, 4, and 9 are obvious over Boies under Ground 2. Therefore, to summarize, Petitioner has met its burden to prove claims 1, 3, 4, and 9 are unpatentable under this ground (claims 2, 7, and 8 are not analyzed under this ground).

3. Obviousness of Claim 10 over Hardouin (Ground 4)

Under Ground 4, Petitioner asserts that independent claim 10 would have been obvious over Hardouin. Pet. 69–80 (citing Ex. 1001, 8:21–26, 14:58, 16:57–59, 17:58–63, Fig. 5B; Ex. 1003 ¶¶ 109, 278–282, 284–287, 289–291, 293–296; Ex. 1027, Abstract, 1:10–16, 1:24–42, 1:57–2:3, 2:7–20, 2:29–37, 2:39–3:33, Fig. 1–3; Ex. 1030, 23:55–59). As with the other grounds, under Ground 4, Petitioner maps the disclosure of Hardouin to the limitations of claim 10.

Regarding claim 10's limitation 10.0 ("*A safety control system for driving residing on a portable communication telematic device, the safety control system comprising: a portable communication device running at least one software application and having at least one of an input and at least one output*"), Petitioner asserts it would be obvious over Hardouin's disclosure of a portable, wireless telephone for use in and out of a vehicle and a system that regulates the input/output and functionality of the wireless telephone via software on the device based on the speed of the vehicle so as to mitigate a dangerous driving condition. *Id.* at 70–72 (citing Ex. 1001, 16:57–59 (confirming a cellular phone is a telematic device); Ex. 1003 ¶¶ 278–282; Ex. 1027, 1:10–16, 1:24–42, 1:57–2:3, 2:17–20, 2:32–37, 2:39–3:33, Fig. 1–3).

Turning to limitation 10.1 ("*at least one sensor operable to sense at least one condition related to driving environment and data providing information indicating at least one distracting feature for at least one software application*"), Petitioner asserts that it is taught by Hardouin in disclosing its wireless telephone has a speed transceiver 129 (connected to GPS and/or speedometer) that receives data used by its control unit to

calculate vehicle speed. *Id.* at 72–74 (citing Ex. 1001, 17:58–63, Fig. 5B (confirming that vehicle speed is a distracting condition of the driving environment); Ex. 1003 ¶¶ 284–287; Ex. 1027, Abstract, 1:10–13, 1:67–2:3, 2:7–15, 2:39–3:33, Figs. 1–3).

Regarding claim 10's limitation 10.2 ("*a controller in communication with the sensor and the data and the software application and the telematic device, wherein the controller prevents said at least one application output from being provided to the driver in the original format of said at least one output, and provides said at least one output to the driver in a different format*"), Petitioner asserts that Hardouin's control unit 101 performs the claimed steps in that it is in communication with the speed transceiver sensor and its associated data, and is a part of and in communication with the telephone. *Id.* at 74–75 (citing Ex. 1003 ¶ 289; Ex. 1027, 2:39–43, Fig. 1).

Further, Petitioner asserts that this control unit prevents application output from the telephone to the driver in an original format (full phone function and notifications) and provides it in a different format because, if the system senses a vehicle speed exceeding some predefined speed, the control unit mutes the telephone so as not to alert the user, which is a different output according to the '944 patent and related U.S. Patent 9,047,170 (Ex. 1030, "the '170 patent"). Petitioner cites the '944 patent's disclosure that muting an alarm in response to exceeding a threshold is a form of different output for a device. *Id.* at 76 (citing Ex. 1001, 8:21–26, 14:58). Petitioner also cites the '170 patent's claims that state, "the step of providing said at least one output to the driver in a different format comprises selecting at least one from the group consisting of . . . muting the telematic device." *Id.* (citing Ex. 1030, 23:55–59). Petitioner cites

Mr. Andrews's testimony at paragraphs 290–291 as support for its position that, according to the inventor and the intrinsic record, fully muting a wireless telephone is an output different than allowing the phone to alert a user to a call (the "*original format*"). *Id.*

For context, the '170 patent and the '994 patent share the same named inventor, Mouhamad Ahmad Naboulsi, and have substantially similar written descriptions, and the '994 patent states that it "is a continuation of U.S. patent application Ser. No. 14/661,598 filed Mar. 18-2015, which claims the benefit of an[d] priority from U.S. patent application Ser. No. 13/663,085, filed Oct. 29, 2012," which is the patent application that issued as the '170 patent. Ex. 1001, code (72), 1:6–9; Ex. 1030, codes (21), (72). The '994 patent expressly incorporates by reference the disclosure of the '170 patent (via its application). Ex. 1001, 1:17. Patent Owner cites *Omega Engineering, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1334 (Fed. Cir. 2003) for its holding that "the same claim term in the same patent or related patents carries the same construed meaning," and cites *Z4 Technologies, Inc. v. Microsoft Corp.*, 507 F.3d 1340, 1348 (Fed. Cir. 2007) for its holding that it is correct to construe a claim term in a first patent as having the same meaning as the same claim term in a related patent. Reply 17. We agree with Petitioner's interpretation of this claim limitation, and that Hardouin teaches it by disclosing a controller that mutes a cellular phone as a function of vehicle speed.

Finally, regarding limitation 10.3 ("*wherein the controller controls when at least one input into the software application and at least one output from the software application are provided to the driver so that prior to permitting the driver to access said input or prior to providing an output*

from the software application on the telematic device to the driver, the controller determines whether said at least one condition is within a thresholds and permits the driver to access said input or provides said output to said driver only when said at least one condition is within the threshold"), Petitioner asserts that this is taught by Hardouin in disclosing the functioning of the wireless telephone is inhibited (as noted above) if the speed of the wireless phone in the vehicle exceeds a predefined speed (e.g., 5 MPH). Pet. 77–80 (citing Ex. 1003 ¶¶ 293–295; Ex. 1027, Abstract, 1:25–28, 1:37–40, 2:16–19, 2:29–32, 2:39–3:15, Figs. 2–3).

In view of the above-discussed assertions by Petitioner and the related evidence of record, Petitioner has accounted for all elements of claim 10 in Hardouin's disclosure by a preponderance of evidence. We agree with Petitioner that Hardouin teaches the safety control system of claim 10 so as to render it obvious. We address Patent Owner's arguments to the contrary and why they are not persuasive below. We do not necessarily address issues not in dispute. *See In re NuVasive, Inc.*, 841 F.3d at 974.

Similar to its argument over Ground 2, Patent Owner argues that Hardouin fails to teach a *telematic device*, based on Patent Owner's claim construction of the term. Resp. 52. Like Boies, Hardouin teaches a mobile telephone and for the same reasons discussed above, we find that Hardouin teaches a telematic device and find Patent Owner's argument unpersuasive.

Next Patent Owner argues that Hardouin does not teach the second "different" output of limitation 10.2 because disabling all features of a mobile phone does not qualify as output in a different format. *Id.* at 53–59. This is not a persuasive argument because, as initially asserted by Petitioner (Pet. 76–80), the intrinsic record of the '994 patent, which includes the

disclosure of the related '170 patent and, in particular, its claims that share terminology with claim 10 of the '994 patent, expressly defines that:

> ***providing said at least one output to the driver in a different format comprises*** selecting at least one from the group consisting of changing the volume, changing the sound effect, changing the tactile feedback, ***muting the telematic device***, converting text to speech, blocking video output but permitting audio output, and replacing video output with a different display.

Ex. 1030, 23:55–61 (dependent claim 14) (emphasis added); *see also* Reply 15–20 (further addressing this point). This claimed step of providing output in a different format further defines a method recited by the '170 patent's claim 1, which recites "[a] method for controlling a telematic device in a vehicle operated by a driver" that is quite similar to the method of claim 10 in that the system senses movement, determines if a threshold is met, and prevents output in an original format and provides output in a different format. Ex. 1030, 22:55–23:6. The "different format" of claim 14 of the '170 patent informs the meaning of the "different format" of claim 10 of the '994 patent; a point of law and fact conceded by Patent Owner at the final hearing. Hr'g Tr. 30:13–16 (JUDGE FLAX: Let me ask you this. Are you disputing that your related patent's claims would be informative of the language of your challenged patent's claims? MR. SHANAHAN: No. I think it's relevant.").

We agree with Petitioner's position that Hardouin teaches "[i]f control unit 101 determines that the speed is above a predefined amount, it does not alert the user of the wireless telephone via audio transducer 117 or vibration transducer 118," that the '170 patent identifies "muting the telematic device" as providing the telematic device output in "a different format," that

providing the output in a different format has the same meaning in the ’170 and ’994 patents, and that Hardouin therefore teaches limitation 10.2. Ex. 1027, 2:17–20; Ex. 1030, 23:55–61; *see also* Ex. 1003 ¶¶ 289–291, 293–296 (Mr. Andrews discussing the same). Therefore, we are unpersuaded by Patent Owner’s argument on this issue.

Finally, Patent Owner argues Petitioner did not sufficiently identify how Hardouin teaches a controller that determines if a threshold is exceeded to control the output of the telematic device as recited in claim 10, because Hardouin does not teach the second different output claimed. Resp. 59–60. We are not persuaded.

Petitioner identifies in Hardouin the telematic device (wireless telephone), the sensor (speed transceiver associated with GPS/speedometer), and the controller (control unit 101), required by claim 10 to perform all the recited steps. Pet. 69–80; *see also* Ex. 1003 ¶¶ 109, 278–282, 284–287, 289–291, 293–296 (addressing the same). Petitioner also explains how the ordinarily skilled artisan would have understood Hardouin in terms of how these elements perform the claimed functions. Pet. 69–80; Ex. 1003 ¶¶ 109, 278–282, 284–287, 289–291, 293–296. We find no deficiencies in Petitioner’s assertions or evidence and, so, are unpersuaded by Patent Owner’s argument.

In summary, we find Petitioner has established by a preponderance of the evidence that claim 10 is obvious over Hardouin.

III. PETITIONER’S MOTION TO EXCLUDE

Petitioner moves to exclude Exhibits 2030 and 2031. Mot. 1. Exhibit 2030 is U.S. Patent 8,301,108 B2 and Exhibit 2031 is a “Supplemental Declaration of John Peck.” Patent Owner filed these exhibits on September

8, 2020, with Patent Owner's Sur-Reply. Petitioner timely objected to the exhibits on September 9, 2022. Paper 19. Petitioner asserts that it requested Patent Owner withdraw the exhibits on the same day, which Patent Owner declined to do. Ex. 1043, 1. A series of communications between the parties followed, but Patent Owner, ultimately, maintained the Sur-Reply and exhibits as filed. Mot. 1–2; Ex. 1043, 2–6.

Petitioner requests that we exclude Exhibits 2030 and 2031 because they are new evidence other than deposition transcripts of the cross-examination of a reply witness, and are prohibited under 37 C.F.R. § 42.23(b), as explained in our Consolidated Trial Practice Guide. Mot. 1. Patent Owner opposes the Motion, asserting that it submitted Exhibits 2030 and 2031 not as new evidence, but as rebuttal evidence to what it deemed to be new arguments raised in Petitioner's Reply. Opp. 1.

Petitioner is correct that our Rules, as explained in our Consolidated Trial Practice Guide (2019) ("CTPG"), prohibit submitting new evidence (without authorization) with a sur-reply other than deposition transcripts of the cross-examination of a reply witness. *See* 37 C.F.R. § 42.23(b); CTPG 73–74. The Trial Practice Guide explains:

> Sur-replies to principal briefs (i.e., to a reply to a patent owner response or to a reply to an opposition to a motion to amend) normally will be authorized by the scheduling order entered at institution. ***The sur-reply may not be accompanied by new evidence other than deposition transcripts of the cross-examination of any reply witness***. Sur-replies should only respond to arguments made in reply briefs, comment on reply declaration testimony, or point to cross-examination testimony. As noted above, a sur-reply may address the institution decision if necessary to respond to the petitioner's reply. This sur-reply practice essentially replaces the previous practice of filing observations on cross-examination testimony.

> Generally, a reply or sur-reply may only respond to arguments raised in the preceding brief. 37 C.F.R. § 42.23, except as noted above. "Respond," in the context of 37 C.F.R. § 42.23(b), does not mean proceed in a new direction with a new approach as compared to the positions taken in a prior filing. While replies and sur-replies can help crystalize issues for decision, a reply or sur-reply that raises a new issue or belatedly presents evidence may not be considered. The Board is not required to attempt to sort proper from improper portions of the reply or sur-reply.

CTPG 73–74 (emphasis added).

Patent Owner asserts that the claims from the '108 patent (Ex. 2030) were included in the record because they were already in Exhibit 2018 (infringement contentions from district court litigation) and therefore were not new, but, in any event, were "added . . . for the Board's convenience." Opp. 2. We find unpersuasive Patent Owner's assertion that Exhibit 2030 is not new. The evidence was not newly discovered (based on Patent Owner's assertion), yet the Exhibit was not made of record prior to Patent Owner filing it with its Sur-Reply. It was submitted with the Sur-Reply as new evidence. Also, Patent Owner argues that Exhibit 2031 is submitted to demonstrate new arguments by Petitioner to which it responds. *Id.* at 3–4.

Patent Owner does not contend nor do we find that Exhibits 2030 and 2031 are deposition transcripts of the cross-examination of any reply witness. Moreover, a supplemental declaration by an expert witness is not a proper way to identify or object to what a party perceives to be "new arguments" in a reply. *See* CTPG 73–75. Thus, the Exhibits were improperly submitted, without authorization, and in violation of our Rules and Guidance.

Our Rules and Consolidated Trial Practice Guide are clear on this prohibition. And, the Consolidated Trial Practice Guide explains: "[w]here a party believes it has a basis to request relief on a ground not identified in the rules, the party should contact the Board and arrange for a conference call with the Board and opposing party to discuss the requested relief with the judge handling the proceeding." CTPG 75. Thus, the Board identifies appropriate ways for a party to address matters that it considers to be beyond the specific procedures outlined in the Rules. Merely submitting new evidence was not authorized by Board Rules or Guidance and Patent Owner did not seek authorization to file the new evidence.

The facts warrant excluding Exhibits 2030 and 2031 and we *grant* the Motion. *See* CTPG 81.

IV. CONCLUSION

Petitioner establishes by a preponderance of the evidence that claims 1–4 and 7–10 of the '994 patent are unpatentable as obvious.[11] Our final decision is summarized as follows:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–4, 7–9	103	Tan	1, 3, 4, 9[12]	
1–4, 7–9	103	Boies	1, 3, 4, 9[13]	
2, 7, 8	103	Tan, Shuman, Behr	2, 7, 8	
10	103	Hardouin	10	
Overall Outcome			1–4, 7–10	

Further, Petitioner's Motion to Exclude is *granted* for the reasons set forth above.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has proved by a preponderance of the evidence that claims 1–4, 7–10 of the '994 patent are unpatentable;

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[11] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

[12] Claims 2, 7, and 8 are not analyzed under this ground.

[13] Claims 2, 7, and 8 are not analyzed under this ground.

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2; and

FURTHER ORDERED that Petitioner's Motion to Exclude is *granted*.

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US009713994B2

(12) **United States Patent**
Naboulsi

(10) **Patent No.: US 9,713,994 B2**
(45) **Date of Patent: Jul. 25, 2017**

(54) **SAFETY CONTROL SYSTEM FOR APPS IN VEHICLES**

(71) Applicant: **ACT-IP**, West Bloomfield, MI (US)

(72) Inventor: **Mouhamad Ahmad Naboulsi**, West Bloomfield, MI (US)

(73) Assignee: **ACT-IP**, West Bloomfield, MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **15/352,206**

(22) Filed: **Nov. 15, 2016**

(65) **Prior Publication Data**

US 2017/0182956 A1 Jun. 29, 2017

Related U.S. Application Data

(63) Continuation of application No. 14/661,598, filed on Mar. 18, 2015, now Pat. No. 9,524,034.

(51) **Int. Cl.**

G06F 3/02	(2006.01)
B60R 16/023	(2006.01)
G08B 21/06	(2006.01)
B60R 11/02	(2006.01)
B60Q 9/00	(2006.01)
G06F 3/01	(2006.01)

(Continued)

(52) **U.S. Cl.**
CPC ***B60R 16/0232*** (2013.01); ***B60Q 9/008*** (2013.01); ***B60R 11/0264*** (2013.01); ***G06F 3/017*** (2013.01); ***G06F 3/0227*** (2013.01); ***G08B 21/06*** (2013.01); ***H04M 1/6091*** (2013.01); ***H04M 1/72577*** (2013.01); *B60K 2350/906* (2013.01); *B60K 2350/967* (2013.01); *B60W 2520/105* (2013.01)

(58) **Field of Classification Search**
CPC . B60R 16/0232; B60R 11/0264; B60Q 9/008; G06F 3/017; G06F 3/0227; G08B 21/06; H04M 1/6091; H04M 1/72577; B60K 2350/906; B60K 2350/967
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,555,502 A * 9/1996 Opel B60H 1/00985 701/36
5,949,149 A * 9/1999 Shitanaka .... B60Q 1/0082 200/5 R

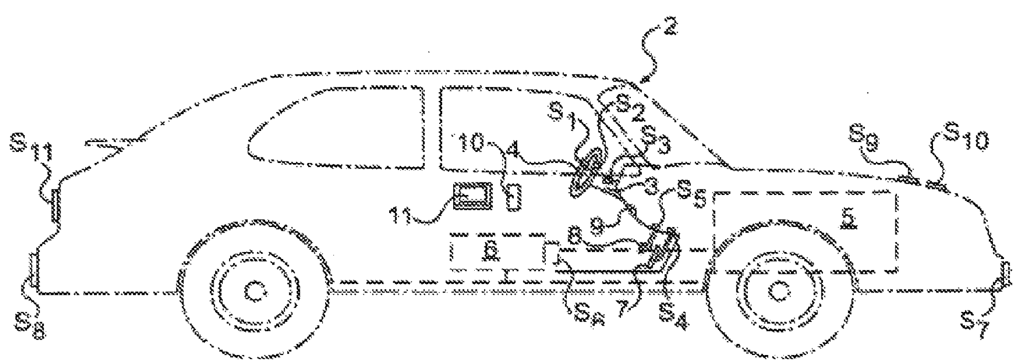
(Continued)

Primary Examiner — Richard Camby

(57) **ABSTRACT**

According to one aspect of one embodiment of the present invention, a safety control system for using applications in vehicles, includes, a communication device having at least one of an input accessible from within the vehicle and an output communicated within the vehicle, at least one sensor operable to sense at least one condition related to vehicle operation, and data about distraction features of a running application, to and a controller communicated with the sensor and the communication device to selectively suppress at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold. When an input is suppressed, the driver is prevented from accessing or inputting information into the communication device. When an output is suppressed, communication between the device and the driver of a vehicle is suppressed to, among other things, avoid distracting the driver during certain driving situations or conditions relating to the driver, vehicle and/or environment.

10 Claims, 7 Drawing Sheets



(51) **Int. Cl.**
H04M 1/725 (2006.01)
H04M 1/60 (2006.01)

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,078,293	A *	6/2000	Yamamoto	B60R 25/245 307/10.2
6,396,006	B1 *	5/2002	Yokoji	G06F 3/0312 200/11 R
6,479,769	B1 *	11/2002	Barat	H01H 13/70 200/4
6,529,125	B1 *	3/2003	Butler	B60K 37/06 340/407.1

* cited by examiner

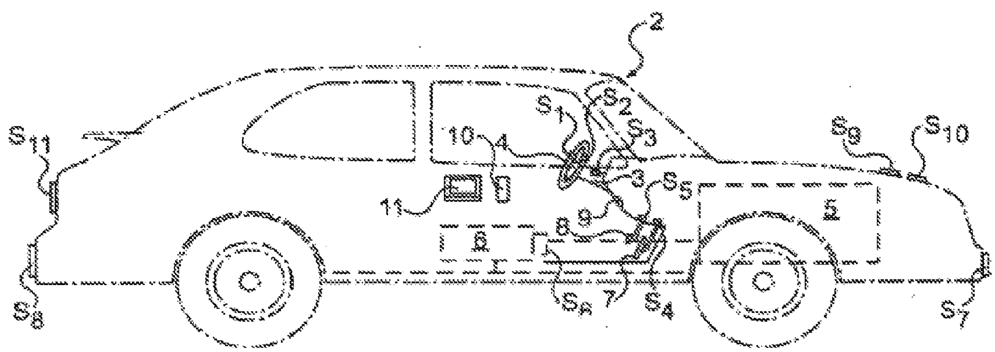


Figure 1

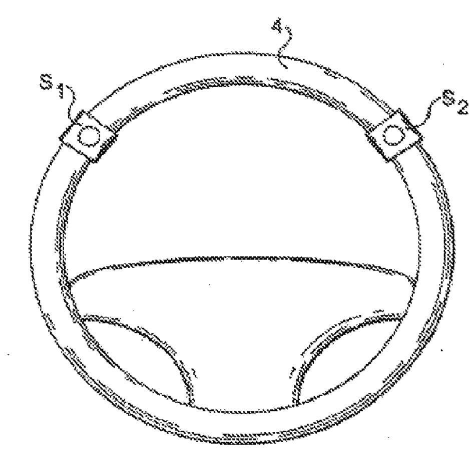


Figure 2

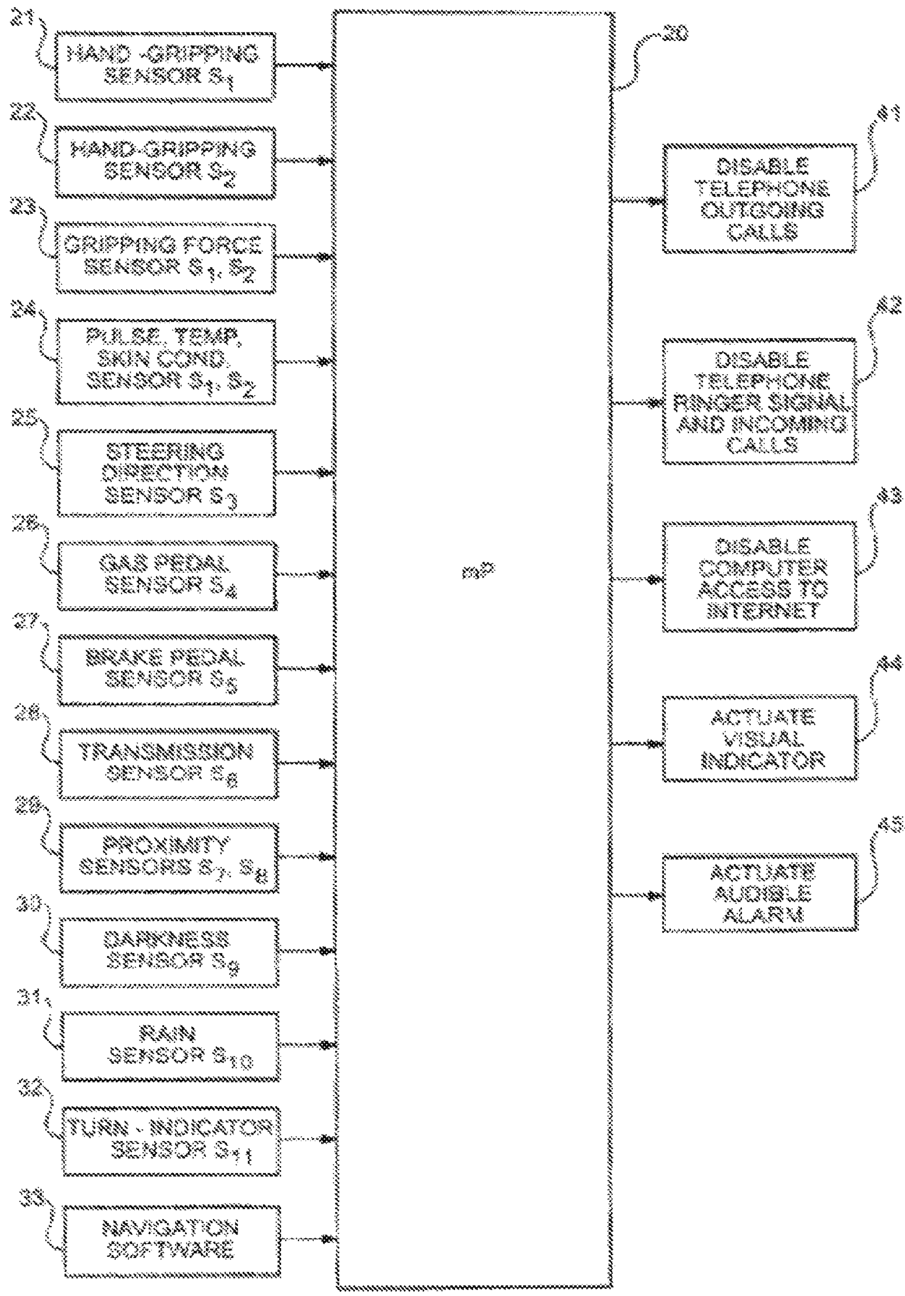
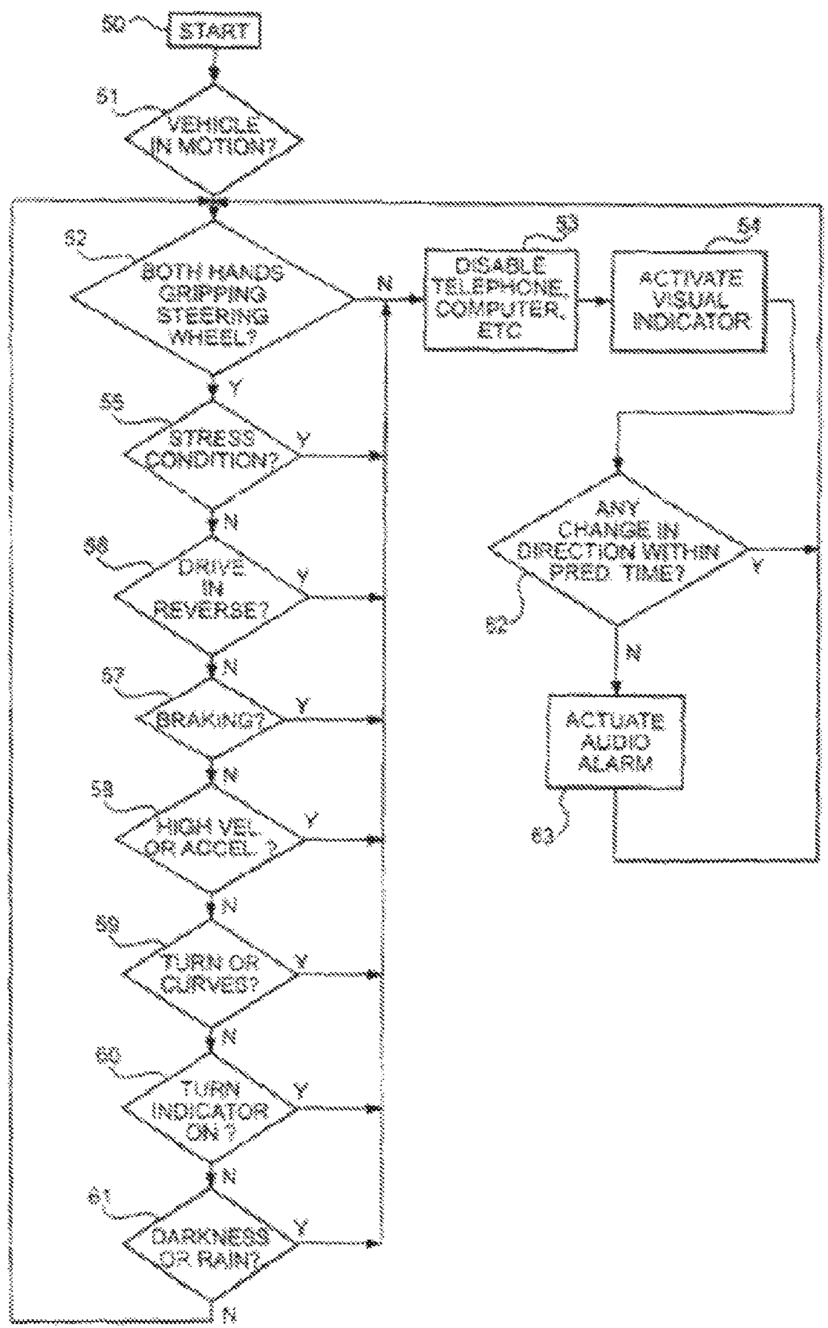
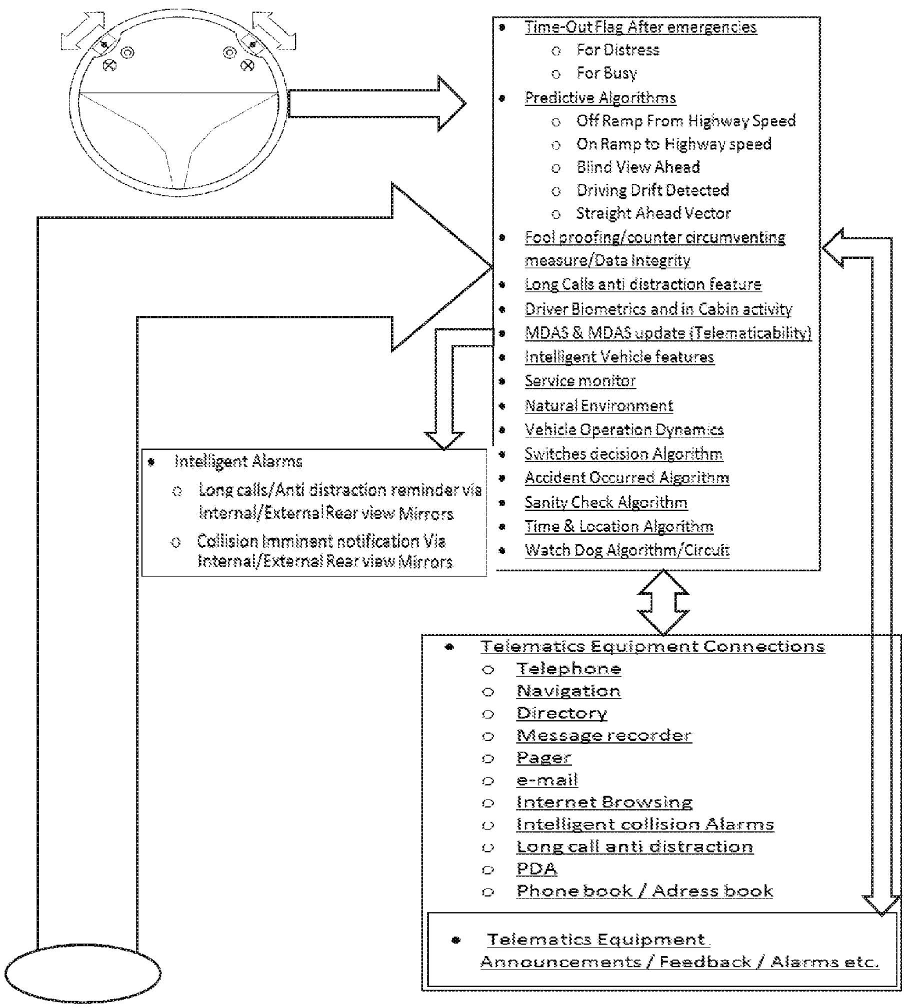

21
HAND -GRIPPING SENSOR S1
22
HAND-GRIPPING SENSOR S2
23
GRIPPING FORCE SENSOR S1, S2
24
PULSE, TEMP, SKIN COND. SENSOR S1, S2
25
STEERING DIRECTION SENSOR S3
26
GAS PEDAL SENSOR S4
27
BRAKE PEDAL SENSOR S5
28
TRANSMISSION SENSOR S6
29
PROXIMITY SENSORS S7, S8
30
DARKNESS SENSOR S9
31
RAIN SENSOR S10
32
TURN - INDICATOR SENSOR S11
33
NAVIGATION SOFTWARE
20
mP
41
DISABLE TELEPHONE OUTGOING CALLS
42
DISABLE TELEPHONE RINGER SIGNAL AND INCOMING CALLS
43
DISABLE COMPUTER ACCESS TO INTERNET
44
ACTUATE VISUAL INDICATOR
45
ACTUATE AUDIBLE ALARM

Figure 3



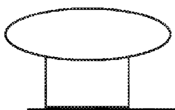
50
START
51
VEHICLE IN MOTION?
52
BOTH HANDS GRIPPING STEERING WHEEL?
N
Y
53
DISABLE TELEPHONE, COMPUTER, ETC
54
ACTIVATE VISUAL INDICATOR
55
STRESS CONDITION?
Y
N
56
DRIVE IN REVERSE?
Y
N
57
BRAKING?
Y
N
58
HIGH VEL. OR ACCEL. ?
Y
N
59
TURN OR CURVES?
Y
N
60
TURN INDICATOR ON ?
Y
N
61
DARKNESS OR RAIN?
Y
N
ANY CHANGE IN DIRECTION WITHIN PRED. TIME?
Y
N
62
ACTUATE AUDIO ALARM
63

Figure 4



Time-Out Flag After emergencies
For Distress
For Busy
Predictive Algorithms
Off Ramp From Highway Speed
On Ramp to Highway speed
Blind View Ahead
Driving Drift Detected
Straight Ahead Vector
Fool proofing/counter circumventing measure/Data Integrity
Long Calls anti distraction feature
Driver Biometrics and in Cabin activity
MDAS & MDAS update (Telematicability)
Intelligent Vehicle features
Service monitor
Natural Environment
Vehicle Operation Dynamics
Switches decision Algorithm
Accident Occurred Algorithm
Sanity Check Algorithm
Time & Location Algorithm
Watch Dog Algorithm/Circuit
Intelligent Alarms
Long calls/Anti distraction reminder via Internal/External Rear view Mirrors
Collision Imminent notification Via Internal/External Rear view Mirrors
Telematics Equipment Connections
Telephone
Navigation
Directory
Message recorder
Pager
e-mail
Internet Browsing
Intelligent collision Alarms
Long call anti distraction
PDA
Phone book / Adress book
Telematics Equipment Announcements / Feedback / Alarms etc.

Figure 5A



From BUS or SENSOR OR CALCULATED VALUES

Drive
- Parking Gear
- Neutral Gear
- Drive Gear
- Clutch depressed (M/T Only)
- Transmission Shift UP/Down
- Brake activation
- G Force/Two planes
- Throttle position, position/time
- Gas Pedal position, position/time
- Valves Intake / Exhaust position sensor
- Tachometer-Engine RPM rate/time
- Valves Intake/Exhaust position sensor
- Tachometer-Engine RPM rate/time
- Automatic Transmission Flywheel dynamic change in Pressure sensor Change in Centripital force.
- Steering member angle, angle/time
- Inclinometer
- Rollover sensor
- Airbag deployment
- Roll/Bank
- Tires Pressure, FR, FL, RR, RL

Active Driver Assistant Systems
- ABS activation Signal(time)
- Adaprive/Intelligent cruise control
- Night vision
- Traction Control signal
- ESP/Stability controls/Anti Roll
- Intersection Collision Warning
- Lane/Road departure

Environment
- Lighting condition Night/Day
- Wiper Setting
- High beam light
- Fog Lamp
- HVAC Setting
- Total Vehicle Weight
- Vehicle speed
- Number of Passengers
- Bearing/Longitude/Latitude/Altitude
- Proximity Alarm, Front Rear Blind spot

Busy
- Turning signal Left/Right
- Emergency Flasher
- HVAC activation
- Wiper activation
- Intelligent food and beverage holder
- Driver Seat Belt
- Accessories activation
- Horn activation
- ISORSP, ISORSU, ISORSD, SSORSP, SSORSU, SORD

Annoyances
- Dog Strap
- Child Crying
- Dog barking detector
- Cigarette smoke

Physiology
- Alcohol Level
- Heart Rate
- Pressure on Steering Mechanism
- Sweat sensor
- Driver Temperature
- Voice Monitor

Security
- Driver Seat Position/Recliner Sensor
- Driver Seat/Back weight Sensor
- Steering Tilt wheel position

Figure 5B

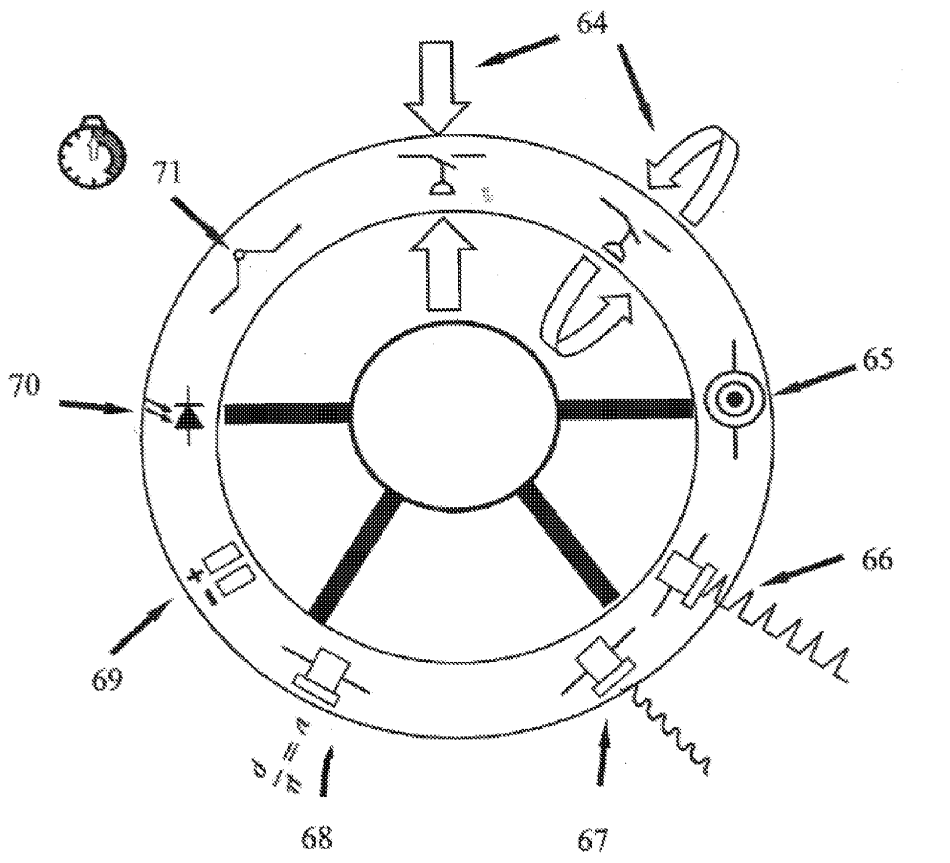


Figure 6

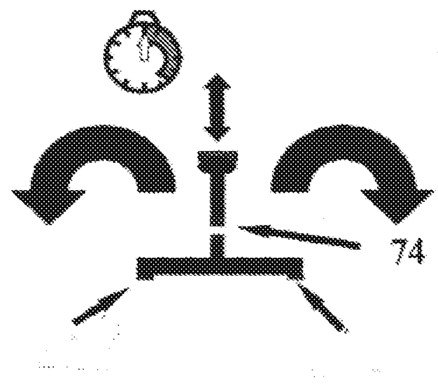


FIGURE 7 A

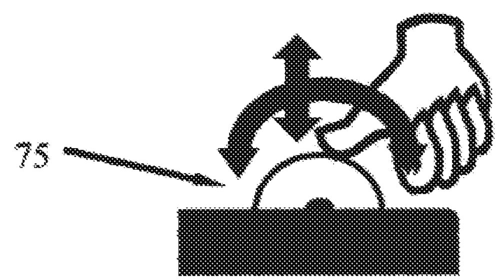


FIGURE 7 B

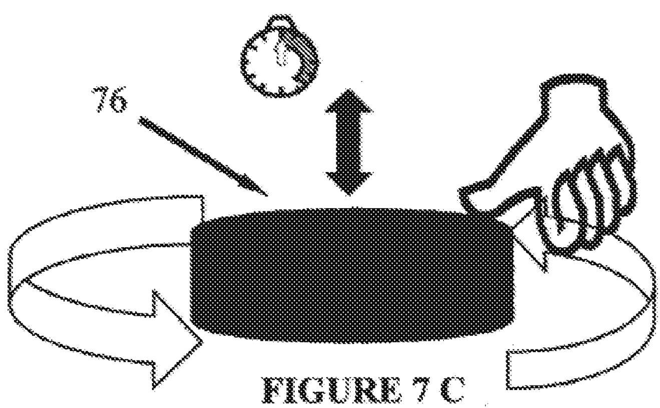


FIGURE 7 C

SAFETY CONTROL SYSTEM FOR APPS IN VEHICLES

REFERENCE TO CO-PENDING APPLICATIONS

The present application is a continuation of U.S. patent application Ser. No. 14/661,598 filed Mar. 18-2015, which claims the benefit of an priority from U.S. patent application Ser. No. 13/663,085, filed Oct. 29, 2012, which claims the benefit of an priority from U.S. patent application Ser. No. 10/383,708, filed May 4, 2004, which claims the benefit of a priority from Ser. No. 10/287,299, filed Nov. 4, 2002, which claims the benefit of a priority from U.S. patent application Ser. No. 10/279,447, filed Oct. 24, 2002, Provisional Application No. 60/336,293 filed Oct. 24, 2001, and Provisional Application No. 60/390,877 filed Jun. 21, 2002, the contents of which are incorporated herein by reference.

FIELD OF THE INVENTION

The present invention relates to the field of telematics, namely to the field of integrating information, communication, computing and entertainment technologies into vehicles for civilian or military use. The invention particularly relates to safety control systems for vehicles to reduce driver distraction, avoiding potentially dangerous conditions tending to produce accidents.

BACKGROUND OF THE INVENTION

One potentially dangerous condition is the use of a vehicle telephone by the vehicle driver while driving the vehicle. The use of telematics in general and particularly cellular telephones by drivers while driving has been found to increase the possibility of an accident since such a telephone not only diverts the driver's attention from driving, but also generally requires the use of at least one of the driver's hands and distract the driver's eyes from the road and traffic. In fact, many states and countries have enacted legislation requiring that telephones used in vehicles by drivers while driving must be of the "hands free" type and usually telematics equipment carries a warning to educate and discourage the driver about the risk of using these devices while driving. However, such legislation is difficult to enforce and education is not usually effective in assuring driver compliance. Moreover, even where the vehicle is equipped with a "hands free" telephone, drivers nevertheless still frequently use one hand for holding or dialing the telephone. When one hand is occupied by holding a telephone, the danger of causing an accident in an emergency situation is increased because of the additional reaction time required to properly grip the steering wheel with both hands. Similar danger exists when the driver attempts to control audio and video equipment, e.g. Radio, Music CD, DVD, Books on tape etc., or when the driver attempts to change environmental controls like adjusting the heat or air conditioning, or other vehicle settings.

There are other potentially dangerous conditions and inherent risks in driving that depends on the driving act itself, such as rapidly accelerating or decelerating, excessive maneuvering, merging to or exiting a freeway, passing, changing lanes, changing gears, depressing the clutch, driving at high speed, negotiating a turn, braking, reverse-driving, or a stress condition on the part of the driver, that could increase the possibility of an accident should the driver be distracted by activation of the telephone or other signal or device. This inherent risk is also dependent on the driving purpose as well, for example, the risk in driving a police cruiser is inherently riskier then in driving a sedan, and driving a delivery van has different risk than driving the family van.

Herbert et al., U.S. Pat. No. 6,188,315 and Brown, U.S. Pat. No. 6,353,778, disclose systems for avoiding preset potentially dangerous conditions while operating a vehicle having a vehicle telephone, but the systems described in those patents are of relatively limited application, and do not provide for avoiding dangerous conditions or to managing risk and individualizing the warnings to individual driving skills or application and to combinations of events and environmental conditions.

SUMMARY OF THE INVENTION

An object of at least some presently preferred embodiments of the present invention is to provide a safety control system for vehicles tending to reduce the possibility of accidents in one or more of the above respects. Another object of at least some presently preferred embodiments of the invention is to provide a method of reducing or avoiding driver distraction during potentially dangerous conditions encountered while operating a vehicle.

According to one aspect of one embodiment of the present invention, a safety control system for vehicles, includes, a communication device having at least one of an input accessible from within the vehicle and an output communicated within the vehicle, at least one sensor operable to sense at least one condition related to vehicle operation, and a controller communicated with the sensor and the communication device to selectively suppress at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold. When an input is suppressed, the driver is prevented from accessing or inputting information into the communication device. When an output is suppressed, communication between the device and the driver of a vehicle is suppressed to, among other things, avoid distracting the driver during certain driving situations or conditions.

According to one aspect of one embodiment of the present invention, there is provided a safety control system for vehicles including a telephone or other input or output device and one or more sensors for sensing instantaneous driver stimuli and/or a potentially dangerous condition and for automatically disabling or suppressing the telephone or other input or output device when sensing such stimuli and condition. In one form, the sensors include two sensors mounted on a steering member to provide an indication of the presence of the driver's hands on the vehicle steering member, and effective to suspend use of the telephone or other input/output device when the two hands of the driver are not sensed as present on the steering member while the vehicle is in motion. This system is modular, dynamic, interactive, and adaptive to each individualized user. In one implementation, the invention employs a method for automated machine prioritizing to provide assistance to the to driver and optimize the functionality of telematics features accessibility by arranging them according to a user's needs and preferences based on usage frequency of individual features and/or application or as customized individually by the user preferences, skills and events. In another embodiment, sensors on a steering member are used to measure changes in driver physiology. Other methods can be used for sensing driver physiology, e.g. via infrared detection, camera and image/color recognition etc.

Smart Speaker: Incoming calls are routed to a speaker that reflects and bounce sounds of front windshield at driver Look Ahead, Eye Level. Or simulate such action so that a driver focuses or has his/her attention directed toward the windshield just like he would do if he is carrying a conversation with another person.

According to further aspects in the described preferred embodiment, the steering member is a steering wheel, and the sensors include two sensors on opposite sides of the steering wheel located to sense the presence of the driver's hands on the steering wheel. Preferably, the two sensors are located approximately on or between the "two" and "ten" and the "three" and "nine" clock positions of the steering wheel.

It will thus be seen that such a system, requiring both hands to be on the steering wheel in order for the driver to operate the input/output devices, not only requires the vehicle to be equipped with a "hands free" interface for the input/output devices, or a system that can be used as such with an adapter or when docked to the system gateway, but also enforces the use of the "hands free" feature by sensing that the driver actually has both hands placed on the steering member before the input/output devices can be operated accessed or displayed to the driver. Disabling the operation of the device would preferably include not only disabling making outgoing and receiving incoming telephone calls, but also disabling the signal (typically audible tones, vibrations, or visible light) of an incoming call, fax, e-mail, the display of non-urgent vehicle status or warning indicators, since such signals, indicators or displays can distract the driver. Such distractions are problematic at times and conditions wherein operation of the vehicle requires more than usual driver attention and interaction, or when other distractions are already present for the driver.

According to further features in the described preferred embodiment, the vehicle may also include a computer or the driver may also use a portable multi-function telematics device in the vehicle allowing access to the Internet or other network for transmitting and/or receiving faxes or e-mail or browsing the web or accessing a WAN, with the sensors also disabling driver initiated access to such devices when the two hands of the driver are not sensed on the steering member while the vehicle is in motion.

In most cases, the steering member would be a steering wheel as presently included in conventional vehicles. However, in certain applications the steering member could be a joystick, or other type of steering member. In such case, the sensors are placed in areas a driver is recommended or required to grip the steering member to safely control the vehicle.

According to further optional features in the preferred embodiment of the invention described below, the sensors may further include devices for sensing vehicle acceleration, deceleration, merging onto or exiting a freeway, passing, changing lanes, changing gears, depressing the clutch, a reverse-drive condition of the vehicle, the braking of the vehicle, the undue proximity of the vehicle to another vehicle, excessive maneuvering, and/or an unduly high velocity of the vehicle, any one of which conditions, or combination of conditions, may also be effective to disable the operation of the telephone, computer, or other potentially distracting equipment, display or indicator within the vehicle.

According to still further optional features in the preferred embodiment of the invention described below, at least one of the sensors on the steering member also senses a physiological condition of the driver and disables the input/output

devices when a predetermined physiological condition is sensed. For example, the physiological conditions sensed could be a predetermined gripping force applied by a hand of the driver while gripping the steering wheel, or a predetermined pulse rate, temperature, blood pressure, blood oxygen level, and/or skin conductivity of the driver. Such physiological conditions may indicate a stress condition of the driver and, when sensed, can lead to disabling or suppressing operation of the input/output devices to avoid aggravating the stressed condition.

The system may also sense a drowsiness condition of the vehicle operator. For example, the system may include a steering direction sensor that actuates a drowsiness alarm when sensing a failure to change the steering direction within a predetermined time, distance interval while accounting for vehicle speed in indicating a possible drowsiness condition in the driver. Additionally, such sensor when monitored with respect to changes over time will indicate jerk reaction, which indicates that the driver was not paying attention and the system will temporarily suspend all telematics to give the driver a chance to recover. Another application for such a sensor is the monitoring of an OFF Zero angle for an extended period of time/distance which can indicate a blind curve or hard curve, and again, here the system will temporarily suspend the telematics and/or input/output devices from interacting with the driver, and vice versa, until normal driving functions are restored.

According to another aspect of the present invention, there is provided a method of avoiding potentially dangerous conditions while operating a vehicle having an input/output device and a steering mechanism including a steering member to be manipulated by the driver, comprising: providing the steering member with two sensors for sensing the presence on the steering member of the two hands of the driver; and disabling the input/output device when the two sensors fail to sense the presence on the steering member of both hands of the driver while the vehicle is in motion.

According to further features in the described preferred embodiment, the input/output devices may also be disabled when the vehicle is traveling in the reverse direction, or is being braked, or is within a predetermined proximity of another vehicle, or is traveling at a high velocity, accelerating, decelerating, merging onto or exiting a freeway, passing, changing lanes, changing gears, depressing the clutch, or a driver is occupied using other accessories in the vehicle or otherwise distracted. Since a high degree of attention of the driver is required under all the foregoing conditions, operation of the vehicle telephone, for example, even the ringing signal of an incoming telephone call, could be highly distracting to the driver and is therefore disabled to avoid the possibility of increasing the risk of an accident.

To assure that the driver and the vehicle as well as on board communication devices as described above are working harmoniously together, one presently preferred embodiment of the system includes the following:

The Driving Systems, (Man, Machine, Environment, Regulation, and History)

Man: the driver, the passengers, the pedestrians, society;

Machine: the car, the telematics, the infrastructure;

Environment: the driving environment (in the car and outside the car and the infrastructure used)

History: the personal driving experience, the equipment maintenance history

Regulation: the existing laws and common safe driving etiquette into, society and the infrastructure regulation.

All of these elements will be harmonized by the system as it isolates the drivers from non driving related distractions

and helps them comply with driving related laws and etiquette via reminders and passive assistance.

Further features and advantages of at least some of the embodiments or implementations of the invention will be apparent from the description below.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects, features and advantages of the present invention will be apparent from the following detailed description of the preferred embodiments and best mode, appended claims and accompanying drawings in which:

FIG. **1** schematically illustrates one form of a safety control system for vehicles constructed in accordance with the present invention;

FIG. **2** is an enlarged view illustrating the steering wheel in the vehicle of FIG. **1** and the sensors mounted thereon;

FIG. **3** is a block diagram illustrating the main components in the system of FIG. **1**;

FIG. **4** is a flowchart illustrating the operation of the system of FIG. **1**; and

FIGS. **5**A and **5**B show a block diagram illustrating the nature and the flow of signals and algorithms used in one presently preferred embodiment of the system of the present invention.

FIG. **6** is a diagram illustrating steering wheel with all sensors described.

FIGS. **7**A, **7**B and **7**C are schematic diagrams illustrating various gesture capture sensors described.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. **1** schematically illustrates a vehicle, generally designated **2**, equipped with a control system for sensing a variety of risk factors and potentially dangerous conditions and for automatically executing various responses when sensing such conditions in order to avoid hazardous situations tending to increase the possibility of an accident. One response is the disabling or suppression of one or more input or output devices to avoid interaction between the devices and the driver in certain situations and conditions. Another response includes providing a signal to or requiring the driver to take some action to increase driver alertness and/or awareness.

One example of a hazardous situation avoided by the control system illustrated in FIG. **1** is the use of the vehicle telephone in certain situations wherein a making of a telephone call by the vehicle driver, or the receiving of an incoming call, particularly the ringing of such a call, may distract the driver and increase the possibility of an accident when the driver is in a high-risk driving situation. Similar increased risk can result from the driver changing vehicle controls like temperature settings, or interacting (e.g. inputting or receiving output) with other telematics such as e-mail, radio, CD, DVD, navigation system, incoming page or the like. In such cases, the vehicle telephone, other telematics and/or other input/output devices are suppressed and no incoming or outgoing signals are allowed to distract the driver. In case the driver is the party initiating the telematics, a visual indicator and audio feedback can be activated to indicate to the driver that telematics is disabled, supply reason therefore, and even recommend driving modification to enable telematics. Another condition sensed by the system is undue stress in the driver, as indicated by the sensed pulse rate, temperature, blood pressure, skin conductivity (e.g. perspiration), loud voice(s) or stressful sounds in the cabin, such as baby crying, dog barking etc., any combination of one or more of which conditions would also disable incoming telematics. A further condition sensed by the system is the possibility of drowsiness on the part of the driver, in which case an audio alarm would be activated to alert the driver to this condition. Examples without limitation of other alarms to overcome driver drowsiness include vibration in the seat, changing HVAC temperature settings and blower speed to extremes, change of seat position, radio volume or station, CD-track etc. The system will restore operation of the input/output devices when conditions are normalized and will notify driver of all missed activities.

Vehicle **2** illustrated in FIG. **1** is a conventional vehicle including a steering mechanism, generally designated **3**, having a steering wheel **4**, a propulsion device such as a motor or engine **5** for driving the vehicle via a transmission or other torque converting means schematically indicated **6**, an acceleration pedal **7**, and a braking pedal **8** for controlling the vehicle. Vehicle **2** further includes one or more visual indicator and audio alarms **9**, e.g. mounted within the forward-look ahead viewing or hearing by the driver.

FIG. **1** further schematically illustrates a cellular telephone **10** within the vehicle, and a computer **11** or other multifunction telematic device allowing access to the Internet for transmitting and/or receiving faxes or e-mail, WAN and Web access, or other input/output device. Other input/output devices include vehicle fault/warning lights (battery, temperature, washer fluid, etc.) or other signal or alarm (open door, low fuel level, seat belt monitor, etc.). Vehicle **2** illustrated in FIG. **1** may also include many other components conventionally provided on vehicles at the present time or to be provided in the future.

The safety control system included in vehicle **2** illustrated in FIG. **1** includes a plurality of sensors for sensing various conditions with respect to the vehicle driver, the vehicle itself and/or the environment. These signals are collected via direct tapping to existing or added sensors or via vehicle bus and user specified values. These include sensors S**1** and S**2** in FIGS. **2**, **7**A, **7**B, **7**C applied to the steering wheel **4** of the vehicle; sensor S**3** applied to the steering mechanism **3** of the vehicle to sense changes in the steering direction and/or actuation of the turning indicator. The turning signal indicator switch/lever can also act as a blind spot collision avoidance actuator. When a driver actuates the turn signal indicator by moving the turning signal lever in advance of making a turn, subsequent momentary pull up or momentary push down on the lever will move the corresponding mirror further out to scan the vehicle blind spot.

Other sensors may include sensor S**4** sensing the condition of the gas pedal **7** and/or vehicle speed or acceleration; sensor S**5** sensing the condition of the braking pedal **8**; and sensor S**6** sensing the condition of the transmission or other type torque converter **6**.

Also schematically illustrated in FIG. **1** are sensors S**7** and S**8** carried to sense the proximity of the vehicle with respect to another vehicle; sensor S**9** sensing darkness or alternatively sensing the activation of the headlight; and sensor S**10** sensing weather conditions rain, sleet, snow, ice, temperature and/or sensing the activation of the front or rear wipers or headlight wipers.

As will be described more particularly below, the foregoing sensors (or signals) are generally effective only when the vehicle is moving to sense their respective conditions and to execute certain control functions in order to decrease the possibility of an accident. One important control function is to disable an incoming call from ringing the telephone

10, and the computer or other telematics portable or built in **11** from accessing the Internet or announcing incoming signals, e.g. page, e-mail etc., and to indicate same by actuating a visual indicator and an audio feedback if a driver attempts to initiate telematics during an unsafe or a high risk condition, and may direct a driver to alternative driving habit to gain access to telematics. The system may also suppress delivery of unnecessary external signals such as certain vehicle warning lights or alarms, the system will restore function of the input/output devices when conditions are normalized and will notify driver of all missed activities. In some cases, such as where a drowsiness condition is sensed, an audio alarm **9** is actuated. Other possible alarms to overcome driver drowsiness would include vibration in the seat, changing HVAC temperature settings and blower speed to extremes, etc.

FIG. **2** more particularly illustrates the sensors S**1**, S**2** and in FIGS. **2**, **7**A, **7**B, **7**C mounted on the steering wheel **4**. As shown in FIG. **2**, the two sensors are mounted on or between the "two" and "ten" and the "three" and "nine" clock positions of the steering wheel **4**; the "two" and "ten" positions are considered to be the most preferred ones for the two hands of the driver in order to manipulate the steering wheel, but other positions could be employed, such as "nine and fifteen", which provide more clearance for activated airbags. The two sensors S**1**, S**2** in FIGS. **1**, **6**, **7**A, **7**B, **7**C thus sense the proper positioning of the two hands of the driver on the steering wheel **4**.

The two sensors S**1**, S**2**, which may be attached to or embedded in the steering wheel, may be simple electrical switches that are actuated by the respective hand of the driver when properly placed on the steering wheel.

Preferably, however, one or both of the sensors S**1**, S**2** or other sensors are also capable of sensing a physiological condition of the driver FIG. **6**, such as the gripping force FIG. **6**, applied by the driver's hand, or the pulse rate FIG. **6**, blood pressure FIG. **6**, blood oxygen level FIG. **6**, temperature FIG. **6**, and/or electrical skin conductivity FIG. **6** of the driver's hand while gripping the steering wheel. For example, sensor S**1** FIG. **6**, could include a transducer for converting pressure to an electrical signal FIG. **6**, such as a spring-type FIG. **6**, carbon-type transducer FIG. **6**, optical type FIG. **6**, or semiconductor type FIG. **6**. Sensor S**2** could include one or more transducers, such as known in finger probes FIG. **6** for sensing pulse rate, temperature FIG. **6**, and/or electrical skin conductivity FIG. **6**, and for outputting an electrical signal corresponding to the magnitude of the sensed condition, as described for example in U.S. Pat. Nos. 6,319,205; 5,438,986; 5,065,749; 4,860,759; 6,415,176 or 5,897,505, the contents of which are incorporated herein by reference.

As will be described more particularly below, sensors S**1** and S**2**, FIGS. **2**, **6**, thus sense that both driver's hands are present on both sides of the steering wheel **4** to enable operation of the telephone **10** and the computer **11** or similar multi-function or standalone telematics or other devices. Thus, the telephone **10** can be permitting "hands free operation" or a telephone/telematics system that can be used as such with an adapter or when docked to the system gateway, as required by-many laws to avoid accidents, but also the driver is permitted to use the telephone only in a "hands free" manner, thereby precluding the driver from gripping a telephone to operate it even though the telephone or the telematics system may have a "hands free" capability. While the presently preferred implementation requires actuation of both sensors S**1** and S**2**, the system could be modified to permit use with only one sensor. This will permit use by drivers having only one hand. Requiring presence of at least one hand on the steering member **3** reduces the likelihood of unintended system activation such as may occur, for example, with voice activated systems that can be activated by any sound within a given range or frequency.

In addition, by providing sensor S**1** and/or sensor S**2**, with the capability of sensing a physiological condition FIG. **6**, of the driver while gripping the steering wheel, other conditions can be sensed to disable the telephone for further reducing the possibility of an accident. For example, the gripping force applied by one or both hands of the driver may indicate a stress condition of the driver. A stressed condition may be also indicated by the sensed pulse rate FIG. **6**, temperature FIG. **6**, and/or electrical skin conductivity FIG. **6**, (the latter indicating perspiration) of the driver. If a stress condition is sensed, the telephone **10** is disabled so as to decrease the possibility that the ringing noise of an incoming telephone call will so distract the stressed driver as to create a hazardous condition, or that the making of an outgoing call by the driver will be so distracting to the stressed driver as to create a hazardous condition. Whereas as a matter of standard all alarms are designed to attract attention, e.g. buzzers, ringers, flashing lights, etc., all of these alarms are muted by the gateway and the gateway will communicate all alarms and notification to the driver via driver selected method, e.g. visual, audio or both.

The provision of a grip sensor FIG. **6**, on the steering wheel also enables the system to sense drowsiness or dozing of the driver, as in U.S. Pat. No. 4,485,375, incorporated herein by reference. Thus, if the gripping force sensed by sensor S**1** and/or sensor S**2**, FIG. **6**, drops while the vehicle is in motion, this could indicate a drowsiness condition. If such a condition is sensed, the audio alarm **9**, which may be a separate alarm or a radio volume control or hvac blower and temperature control, or alternatively a vibrator, may be activated, together with a visual indicator in an attempt to arouse the driver and to alert the driver to the drowsiness condition. When drowsiness is sensed, the telephone **10** would not be disabled since the ringing of an incoming call may be further effective to arouse the driver. Other alarms to overcome driver drowsiness would include vibration in the seat, changing HVAC temperature settings and/or blower speed to extremes, etc.

The sensors S**1** and S**2** FIG. **2**, **6** are preferably located at the ten o'clock and two o'clock positions but may be alternatively located in other positions such as the nine o'clock and three o'clock positions. The mechanisms of the switch include, by way of examples without limitation, mechanical FIG. **6**, optical FIG. **6**, or resistive sensors FIG. **6**, or switches FIG. **6**, a jog dial FIG. **7**C or switch (e.g. of the type that can be rotated to scroll amongst choices and depressed to select a choice FIG. **7**B), slide switch and a rocker switch FIG. **7**A. The sensors can be arranged to be actuated either in the thumbs-up position or the thumbs-down position. The sensors are tested for integrity by the microprocessor **20** during start up and are designed to reduce the likelihood of accidental activation. Preferably, the integrity check determines if the switches can be activated and deactivated to ensure that the switches are not stuck in one state. The switches may become stuck unintentionally, or may be purposefully placed in the activated state to override the safety switches and permit actuation of the control system without having one or both hands present on the steering member. The detection of failed switches will cause the microprocessor to block operation of the system. Hence, the integrity check prevents a user from effectively overriding the safety switches to ensure that use of the control

system occurs only when the drivers hand or hands are present on the steering member **3**.

Sensor S**3** is coupled to the steering mechanism **3** so as to sense changes in the steering direction. For example, an alert driver constantly makes minor changes in the steering direction automatically, but not so with respect to a drowsy or dozing driver. Accordingly, if sensor S**3** fails to sense a change in the steering direction within a predetermined time interval, this would indicate a possible drowsiness condition in the driver, and therefore the audio alarm **9** would be activated in an attempt to arouse the driver and alert him to that condition.

Sensor S**4** senses the depression of the gas pedal **7**, and/or vehicle speed or acceleration sensor S**5** senses the depression of the brake pedal **8**, and sensor S**6** senses the condition of the transmission **6** and/or also the velocity of the vehicle. For example, if the transmission is in reverse gear, the driver should not be distracted by receiving or making a telephone call, or by other devices or signals and therefore these things should be disabled. If desired, the same could apply in any gear other than the normal drive gear. Also, if the vehicle is moving at a relatively high velocity, is rapidly accelerating a decelerating, is engaged in turning or otherwise rapidly maneuvering, such that any unnecessary distraction of the driver should be avoided, the devices and signals could likewise be disabled.

Sensor S**7** mounted at the front of the vehicle senses its proximity to a vehicle ahead of it; sensor S**8** mounted at the rear of the vehicle senses the proximity of a vehicle behind it; sensor S**9** senses the darkness level of the road on which the vehicle is traveling (e.g., whether day or night, whether the road is brightly illuminated); sensor S**10** senses a rain condition; and sensor S**11** senses whether either of the turn indicators of the vehicle is operating to signal for a turn or a change of lanes.

The conditions sensed by sensors S**7**-S**11** are also such that a hazard may be produced if, during the existence of such a condition, the full attention of the driver would be diverted by the ringing of the telephone or by the use of the telephone for making an outgoing call. Accordingly, under such conditions, the telephone **10** is disabled from operation. Similarly, the computer **11**, if present, is disabled from operation to preclude access to the Internet for transmitting and/or receiving faxes or e-mail, which could also result in a similar distraction increasing the possibility of causing an accident. And further, other devices, including telematic devices, vehicle signals or alarms, and the like can be suppressed or disabled to avoid or limit distractions to the driver under certain conditions.

FIG. **3** is a block diagram schematically illustrating a microprocessor, generally designated **20**, included in the vehicle safety control system of FIG. **1**, together with its inputs schematically indicated by blocks **21**-**33**, and the outputs schematically indicated by blocks **41**-**45**.

Thus, as shown in FIG. **3**, microprocessor **20** includes inputs **21** and **22** from the steering wheel sensors S**1**, S**2**, to indicate whether driver's hands are on the steering wheel. Microprocessor **20** further includes an input **23** indicating the gripping force applied by one or both of the hands to the sensors S**1**, S**2**, and an input **24**, also from one or both of the sensors S**1**, S**2**, indicating the heart pulse rate, skin conductivity, temperature, blood pressure, blood oxygen level, and/or other physiological condition of the driver having a bearing on proneness of the driver to accidents or instantaneous driver stress level or general physical well-being. As indicated earlier, these inputs indicate particularly whether the driver is in a stressed condition, drowsy, or in an

alternate embodiment, when an optional breath alcohol sensor is activated. In addition to or in place of the sensors S**1** and S**2**, the physiological conditions can be monitored by other sensors mounted elsewhere in the vehicle including on other locations or the entire surface area of the steering wheel. These sensors may be actuated by direct contact with the driver, or by infra red (for example, to sense increased body temperature and the like), or camera (for example, to sense increased driver agitation, flushed facial appearance, by way of examples without limitation).

Another input into microprocessor **20** is from the steering direction sensor S**3**, as indicated by block **25**. This input is helpful in indicating the alertness of the driver, particularly whether the driver may be in a drowsy or even a dozing state, which would be indicated if this input shows no change in the steering direction within a predetermined period of time. The sensor S**3** can also determine rate of change of steering direction, and can provide information used to suppress driver distraction signals when the vehicle is turning sharply, negotiating a long curve that may be blind or of limited sight distance, or during a slalom maneuver.

Another input to the microprocessor would be from a sensor associated with the vehicle cup holder to indicate when a cup which was initially disposed in the holder has been removed, as for drinking. The sensor might include a weight indicator to determine whether the cup was empty when lifted or a temperature sensor to sense heated beverages. This sensor may also sense food on a food tray or elsewhere in the vehicle.

Further inputs into microprocessor **20** include signals from the gas pedal sensor S**4** to indicate high acceleration (block **26**); the braking pedal sensor S**5** to indicate braking (block **27**); the transmission sensor S**6** to indicate high vehicle speed or reverse drive (block **28**); the proximity sensors S**7**, S**8** at the opposite ends of the vehicle to indicate the proximity of the vehicle to other vehicles (block **29**); the darkness sensor S**9** (block **30**); the weather sensor S**10** (block **31**); and turn-indicator sensors S**11** (block **32**), and other sensors such as vehicle speed.

FIG. **3** illustrates a further input from navigation software (block **33**) with which the vehicle may be equipped in order to assist the driver in navigating the vehicle to various desired locations. For example, the navigation software could be pre-programmed to output a signal to microprocessor **20** at certain locations, such as at heavily-trafficked roads, intersections, bridges, tunnels, etc., where the full concentration of the driver is sufficiently critical to avoid distractions as may be caused by a telephone call or other communication to or initiated from the driver. The system could also provide an alarm to the driver indicating an approaching obstacle or condition that will require the driver's attention, including sharp turns, traffic-jams, intersections, bridges, tunnels, railroad crossings, school zones, traffic lights, construction zones, etc. Such locations could also be programmed by the driver by inputting a place mark when such an obstacle or condition is encountered as a reminder to the driver the next time that obstacle or condition is approaching or encountered. Place marks can be automatically applied by the system when certain threshold conditions are met, for example without limitation, unusual steering or swerving, hard braking or deceleration, and the like. Such place marks can be indicative of "near misses" and may represent areas or locations where the driver needs added caution. Any of the place marks can be incorporated or ignored by the driver as they are made, or at any time thereafter, according to the preferences or profile of the

driver. The driver can also set as a preference what criteria the system uses for automatic place marks, or if such place marks are generated at all.

It will be appreciated that other sensors could be provided as inputs into microprocessor **20** wherein similar conditions may occur, either on the part of the driver, the vehicle, and/or the environment, in which, for purposes of safety, external distractions are to be avoided such as may be caused by making or receiving a telephone call, or being alerted by a vehicle signal or alarm, or by any other input/output device.

In the preferred embodiment of the invention, the microprocessor **20**, among other functions, acts as a "state machine" to define, arrange and prioritize features and functionalities of the system. In other applications this function can be performed by standalone which interconnects with a microprocessor **20**. The state machine aspect of the microprocessor may make telematic control decisions on a variety of criteria such as: (a) the frequency of use of the application, the frequency in which a number, e-mail or URL is contacted; (b) based on safety/urgency priorities, e.g. cruise or CD changer, cell messages or other telematics, or music played on the radio; (c) as preset by the operator; (d) optionally, based on other collected information from the driving system, the microprocessor will initiate calls at predetermined times out of voice mail as, for example, when the driver completes backing out of a driveway and begins a trip. More frequently used applications can be placed higher in the order of applications than others so they can be more quickly and easily accessed, thereby reducing driver involvement in selecting and activating such applications. Further, active applications or most recently used applications can be placed higher in the order of applications so that they can be more quickly and easily accessed. And priority can be given to driving related features or controls over convenience or communication based controls. For example without limitation, if the vehicle cruise control system is active, the first application made available to the driver upon actuation of the control system is preferably the cruise control so that the driver can make any changes to the current cruise control settings, preferably by toggling through and selecting various options/features/settings with the safety switches on the steering wheel. Similarly, if an incoming telematic communication is announced by the system and the system determines it safe to inform driver of such communication, such communication is immediately available for the driver, even if such communication is normally low on the driver priority level.

The user provides signals to the state machine to block features or incoming telematics based on ID, location of phone numbers, e-mail addresses or URL. The blocked or stored telematics will be announced to the driver or stored for use in controlling the system in the future.

The state machine employs an assessment of the incoming calls and places them in categories such as: (a) likely and/or known to cause distraction and accidents; (b) likely but not known to cause distraction and accidents; (c) may cause distraction or accidents; (d) not likely and not known to cause distraction and accidents. These categories will be used to determine the effect of the incoming signals on the telematic system in accordance with the following Table 1:

TABLE 1

Device/Feature assessment.
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Applied Computer Technologies, Inc.

Categories	Effect	Rank A	Rank B	Rank C	Rank D
1	Likely AND/OR Known to cause distraction AND accidents	X	?	?	?
2	Likely BUT NOT Known to cause distraction AND accidents	?	X	?	?
3	May Cause distraction or accident	?	?	X	?
4	NOT Likely AND NOT Known to cause distraction AND Accident	?	?	?	X

Application usage Assessment
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01-clearly separating what's:	1a-Important for safe driving	Class A
	1a.1-Subject Vehicle	Class A-S
	1a.2-Other Vehicles	Class A-O
	1b-Important to drivers	Class B
	1c-"Nice to Have" for drivers	Class C
	1d-"Important/Nice to Have" for passengers	Class D

User interface requirement Assessment
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02-Assuring driver intent	Class A
03: Simplicity	Class A
04: Accessibility	Class A
05: High Availability	Class B
06: Universality	Class B

Self customization/individualization requirement Assessment

07: Portability	Class B
08: adaptive	Class A
09: Privacy	Class B

Owner requirement Assessment

10: cost	Class C
11: Interchangeability	Class A

Classification A B or C need to be addressed. D can be totally ignored.

The outputs from microprocessor **20** include control signals as shown by the following blocks: block **41**, effective to disable the telephone or other telematics from making outgoing calls; block **42**, effective to disable the telephone or other telematics from receiving incoming calls and from actuating the ringing signal; block **43**, effective to disable the computer, if provided, from accessing the Internet to make or receive e-mail, faxes, etc. or to disable any other signal to be otherwise communicated to the driver; block **44**, effective to actuate a visual indicator viewable by the driver; and block **45**, effective to actuate an audible alarm.

These blocks are representative of a wide range of outputs that may be utilized. For example, while block **41** is nominally listed as disabling outgoing telephone calls, the system may disable (via output **41** or some other output) all communications or input devices to prevent the driver from inputting or initiating activities or communications from them. In addition to disabling incoming telephone calls, output **42** or some other output can disable the output of any or all input/output devices to prevent communication to the driver of the particular output signals from these devices. Hence, the system may disable or suppress the output alarms or signals of a computer, PDA, pager, navigation system, and vehicle alarms or fault indicators (e.g. low fuel level, low washer fluid level, open door, unfastened seat belt indicators, etc). The outputs **44**, **45** nominally set forth as

actuating visual or audible alarms, can also be used to actuate one or more mechanisms within the vehicle. For example, without limitation, the outputs **44**, **45** or other output(s) may be operable to move one or more rear view mirrors on the vehicle under certain conditions to change the field of view of the mirrors and aid the driver in maneuvering the vehicle, such as during a lane change at vehicle speed.

Outputs **44** and **45** can activate visual and/or audible alarms to draw the driver's attention to desired locations in the vehicle. This may be useful, for example, to draw the driver's attention to the rear-view mirror within the vehicle when a vehicle behind the driver's vehicle is sensed as being too close to the driver's vehicle for the relative speeds of the vehicles. Here, flashing a light or activating some other visible or audible alarm causing the driver to look in the rear-view mirror can aid the driver in avoiding a potential rear-end collision. Similar lights or alarms can be activated on or adjacent to the outside rear-view mirrors to draw the driver's attention to a particular side of the car. In this latter example, activation of a turn-signal indicating the driver is going to turn in one direction or switch lanes in that direction, may cause a visual alarm to be activated if a vehicle is sensed in sufficiently close proximity to the driver's vehicle in the generally intended direction of travel. In this scenario, the outside rear-view mirror may also be moved automatically by the system to change the field of vision the driver has through that mirror and thereby locate any vehicles in the "blind spot" of that mirror prior to its adjustment.

Additionally, the visual, audible, tactile or other alarms may be activated to increase the driver's attention and/or alertness during certain situations. A drowsy driver may be aroused or have his road alertness increased by flashing or otherwise illuminated or activated (e.g. audible or tactile) alarms. One widely available audible alarm includes the vehicle radio wherein the system can change the volume of the radio to arouse a drowsy driver. A driver engaged in a lengthy telephone conversation, or a lengthy internet usage session, or other lengthy communication session, may become overly focused on the communication and less focused on driving. In such situations, at least some people become focused straight forward, and lack awareness of the peripheral environment, exhibiting so-called "tunnel vision." Activating visual or audible alarms can cause the driver to look away from straight ahead and thereby increase the driver's awareness of the surrounding environment. The output signals may interrupt or override conflicting signals (e.g. audible signals may override the radio) unless the conflicting signals are safety related, or doing so is likely to increase driver distraction. The output signals are preferably adjusted automatically to overcome existing environmental conditions. For example, audible output signals may be louder if the noise level detected within the vehicle is high (e.g. wind noise from a window rolled down), and visual signals may be adjusted in intensity to better accommodate night or daytime viewing.

Operation

FIG. **4** is a flowchart illustrating an example of the operation of the system of FIGS. **1**-**3**.

Thus, as shown in FIG. **4**, the control system is made operational when the vehicle is in motion (blocks **50**, **51**). When the vehicle is in motion, a microprocessor **20** outputs signals **41**, **42** and **43** (FIG. **3**) disabling the vehicle telephone, computer, etc. within the vehicle (block **53**), and also signal **44** actuating a visual indicator within the vehicle to indicate this condition (block **54**).

If, on the other hand, both hands of the driver are properly sensed on the steering wheel **4** so as to actuate the two sensors **51**, S**2**, one or both of the sensors is used to sense a physiological condition of the driver that might indicate a stress condition (block **55**). For example, such a stress condition could be indicated by an unduly high gripping force applied by one or both of the hands of the driver to the steering wheel, or by an unduly high pulse rate of the driver or skin conductivity of the driver indicating a high degree of perspiration. If such a stress condition is indicated as being present, the telephone, computer, vehicle alarm or signal, etc. are also disabled (block **53**), and a visual indicator activated (block **54**) to indicate this condition.

Next, the system checks to determine the condition of the vehicle, e.g. whether the vehicle: is traveling in reverse, as indicated by sensor S**6** (block **56**); is being braked, as indicated by sensor S**5** (block **57**); is traveling at or over a predetermined high velocity or high acceleration, as indicated by sensor S**6** (block **58**); is executing a curve or turn, as indicated by steering mechanism sensor S**3** (block **59**); is about to execute a turn, as indicated by turn indicator sensor S**11** (block **60**); or is traveling in the dark or in the rain, as indicated by sensor S**9** or sensor S**10** (block **61**). If any of these conditions is sensed, the telephone and the Internet access by the computer are also disabled (block **53**), and a visual indicator is actuated to indicate this condition (block **54**).

As further shown in FIG. **4**, if while the vehicle is in motion no change in steering direction has been sensed within a predetermined time interval (block **62**), an audible, visual or other alarm or vibrator is also activated (block **63**) to alert the driver to a possible drowsiness or dozing condition. Other alarms to overcome driver drowsiness would include vibration in the seat, changing HVAC temperature settings and/or blower speed to extremes, etc.

If desired, a manual override switch can be provided to enable the driver to manually override any of these controls, preferably except for the control of block **52** assuring that both hands of the driver are properly received on the steering wheel.

Setup Scenario:

Driver set up a portable Telematic device such as a cell phone, blackberry, PDA, etc. with driver preferences:

(1) Control preferences, e.g. Hands always Vs Hands on for Telematics only, and/or both hands required on sensors S**1**, S**2** for duration of telematics usage, or both hands needed to initiate telematics, and only one hand required on one of S**1** and S**2** to continue use of telematics,

(2) Annoyance items: Baby crying, Dog barking, smokers in car etc.

(3) Telematics option: Preferred application to use, preferred priority system etc.

(4) Emergency and identifying information.

(5) A driver enters a vehicle.

a. docks all electronic communication equipment, e.g. pager, cell phone, PDA, etc., to the control system wirelessly or physically, thus identifies him/herself to the vehicle.

b. System mutes all Telematics but keeps them active.

c. Driver initiates his/her trip.

Scenario One (Driver Initiated)

The driver wants to make a call, review pages, read e-mail, connect to the Internet, use navigation system, etc. (1) The driver will activate the safety switches by placing both hands on the designated areas of the steering wheel and then, after the system acknowledges safety switch activation by providing the driver with a beep or voice or visual feedback, the driver with his/her hand on the actuated safety

switch will toggle through options with the toggle switch until he gets to a selection that is needed, then using the toggle switch will confirm selection and proceed with the desired action. This could be multiple layers of options and applications, and can be accomplished with one or both of the toggle switches as desired by the driver. The toggle switches preferably can be activated with the thumbs of the driver permitting the hands to remain on the steering wheel. The actuation of the toggle switches can be simplified by a common scheme known as thumb gesture interpretation where a thumbs up (usually indicated by moving a switch upwardly with the thumb or moving the thumb upwardly relative to a switch or sensor) means yes and a thumbs down (usually indicated by moving a switch downwardly with the thumb or moving the thumb downwardly relative to a switch or sensor) means no, such as pushing one or both of the toggle switches upwardly to accept a setting or available option, and pushing one or both toggle switches downwardly to reject a setting or available option. The options can be provided on a HUD or via voice. Even if devices can be activated by voice control, they still need to have the safety switch or switches depressed to ensure driver intention and not an erroneous sound from the radio or a passenger or a malfunction of devices.

During this time the driver's hands must remain at the 10 and 2 position (also called 10:10). The driver must maintain the steering wheel within a specific angle which is calculated based on the following inputs: (1) weather condition, (2) speed of vehicle, (3) proximity of vehicle to others (front/back), feedback from ABS, ESP, traction control, etc. This angle (for example) is about 30 degrees either side of zero if the speed is 40 mph, but it is less when the speed is higher and more when the speed is lower. The driver will also be allowed to temporarily take his hands off the 10:10 position to, for example, make a sharp turn but will have to put them back at 10:10 to continue the previous activity. This amount of time is again dependent on speed, weather, vehicle proximity to others and feedback from ABS, ESP and traction control. In addition to use of a telephone or other telematic device, the switches on the steering member **3** can also be used to control the radio, CD player, cruise control, and environmental settings in the vehicle such as the interior temperature, and blower and heat/AC settings. The switches can be further used to initiate an emergency phone call. In one implementation, an emergency phone call (e.g. dialing 911) can be placed by pushing both toggle buttons in one direction, such as upwardly, and holding them for a period of time. The emergency phone call may activate the phone, or may automatically send by e-mail, voice data or other method information relating to the vehicle position, any airbag deployment, fire or smoke in the vehicle, number of passengers, presence of dogs or other notable things, recent vehicle operational characteristics, and the like. A call to another phone number can be placed by pressing both toggle switches in the other direction and holding them for a desired time.

Scenario Two (Incoming)

Incoming information will be customized by the driver, in accordance with Table A, to select what he/she wants to receive and in what priority. Once incoming information is detected by the system, the system will go through a checklist to verify feedback from steering about position and about speed and ABS and ESP and traction control and weather condition. When all conditions are met, the system will announce the incoming information to the driver who will have to press the safety control switch and accept the communication by holding the toggle buttons momentarily up. While using the toggle switch to accept the incoming information, the remainder of the controls will be as per outgoing, including hands at 10:10.

It will thus be seen that the illustrated system is effective to disable the operation of the telephone, telematic, or other input/output device (and/or access to the Internet by a computer) within the vehicle when any of the above-described conditions is sensed, to thereby avoid a distraction which may cause accidents. The fact that both hands of the driver must be present on the steering wheel in order to enable the operation of the telephone (and/or computer, telematic or other devices) not only requires that the vehicle must be equipped with a "hands free" capability, but that the driver must actually use this "hands free" capability created by the system gateway in order to make or receive telephone calls or other telematics activities. In addition, other sensors could also be provided to disable a vehicle telephone or a multi-function telematics system or Internet access provided by a vehicle computer in response to other conditions, such as the detection within the vehicle of the sounds of an emergency siren in an approaching vehicle, a child crying within the vehicle, the driver handling of a drink or food item from a monitored cup holder or a monitored food tray, or the activities such as modifying the cabin temperature, changing the volume on the radio, extending the sun visor etc.

The monitoring of all such signals, sensors, data and conditions is done by a modular dynamic plug and play state machine that integrates, prioritizes, enables, blocks or mutes telematics application and telematics functionalities based on priorities determined by learning frequency and characteristics of use or by driver preset preferences.

Such machine may be a hardware based, a software embedded in a dedicated hardware or a software/protocol embedded in one or more telematic equipment and it may act as a node on a network of telematic equipment and the vehicle bus, or as a hub for all telematics and a gateway to the vehicle, or any combination of the above.

The state machine can allow driver to set their preferences on a portable telematics device such as a cellular phone, or a WAN, Web site or via a FTP and e-mail. Such set up can be transferred to the vehicle in use when the driver docks the cell phone or other portable telematics devices to the system gateway. The downloaded profile will be updated with driving skills, driver habits and geographical/time/date based notes added by the driver while driving. The updated profile will be uploaded back to the source when the vehicle comes to a final stop, or ongoing as driving is being carried out. Such data may be direct values and status or a statistical representation of a driving experience. Therefore, the driver profile, preferences, history and other relevant data can be transferred to other vehicles by subsequent use of the source within another vehicle. In this manner, the driver's information can be coupled with data particular to the subsequently used vehicle to create another matrix of condition and factor parameters monitored and controlled in use of the vehicle. The information may be stored in any suitable form on any suitable device including on a telematic device (e.g. telephone, PDA, computer, and the like), on a disc, CD, magnetic drive or the like, on a portable digital storage device like those used with digital devices (e.g. compactflash cards, memory sticks, flash drives and the like). The information may also be transmitted to another source, for example, to an internet web space from where it can be later accessed and used as needed. Vehicle data or information may also be stored either on or in the same source as the driver information, or separately. The vehicle data may stay

within the vehicle, or may be transmitted to another location. For example, certain vehicle data may be sent to the vehicle manufacturer or other source to provide information on the performance of the vehicle, consumer use habits, service history, and the like. It should be easy to control access to information stored or generated by the system without the need for a second party. Also, no real time data access is possible to second party without explicit/implicit authorization or high level of sophisticated technology. This protects a drivers profile and other information, including at least the emergency contact information and the like.

The preferences included by the driver will range from telematics management options, e.g. preset priorities or automatic based on learning by frequency of use, tags of time, location and physiology. Preset priorities will allow a driver to assign sequence of access to telematics and telematics functionalities or to block certain activities based on time of day or source of telematics or geography at will. Automatic based learning condition, on the other hand, for example, if the driver physiology shows stress during a telephone conversation with a certain number, such number will be tagged and will be treated as a source of high risk and will be blocked during unusually risky conditions so a driver does not engage in additional cognitive hungry activities. Additionally, if a driver uses telematics device A more often the C which is used more often then B, the access to such devices will be based on the mostly used first. In this case, A is followed by C and C is followed by B. Similar frequency based access priorities are applied to function of such telematics and also prioritized based on time, geography etc.

Other preferences set by the driver can include emergency contacts, medical record summary or identification, etc. to be used along with telemetry data when automatically reporting an accident via text to speech and via e-mail. This will help emergency dispatch understand and prepare the correct type of help needed, e.g. number of passengers, fire in cabin, impact speed, driver physiology and the driving telemetry before and during the impact. The trigger for an accident occurred reporting is preferably by one or more of the following signals: Distance and/or time from speed to zero is smaller than expected (taking into account weather, service monitor, vehicle capabilities, etc.), G-force too high for normal maneuvers, staling after hard breaking, airbag deployment, rollover indication, fire/smoke detected in vehicle.

The decisions to block, enable etc are accomplished by algorithms that share the hosts of signals provided to monitor for specific conditions that are encountered. These algorithms also update the driver profile to include skills and habits for further relaxing or restricting telematics. For example, a driver that drives frequently on expressways and in close proximity to other vehicles will be allowed more leeway then a person that hardly drives on the expressway. Similar monitoring occurs for nighttime driving, adverse weather driving and so on.

In one preferred implementation, as shown in FIG. **5**, the system monitors and analyzes a plurality of factors that can affect the safe travel of the vehicle, either alone or in combination with one or more other factors. Such factors relate generally to the vehicle, the driver, and the environment. The driver has various communication factors, physiological factors, and preferences/habits, skills and historical factors. The vehicle has instantaneous operational factors, and base and historical factors both associated and independent of a driver. The environment includes the interior vehicle environment, the exterior environment, geographic location, and regulatory factors.

Representative examples of driver communications factors include signals and information communicated to the driver such as vehicle warning indicators like low windshield washer fluid, low battery voltage, engine temperature, oil pressure, seat belt usage monitors, and the like. And further examples include input and output features of various devices communicated with the driver such as telephones, pagers, PDA's, computers, fax machines, GPS devices, navigation systems and displays, radios, CD players, CB's, video monitors, and other telematic or informational devices. These devices can be termed communications devices since they permit or provide one-way or two-way communication with a driver of some information or signal. The devices can also be considered input/output devices since some permit or accept driver input and some permit or provide output to the driver. The term input/output devices is not intended to limit application to only devices having both an input and an output, any device permitting or providing either an input or an output, or both, may be used.

Representative examples of driver physiological factors have already been set forth, and include skin conductivity, pulse rate, blood pressure, blood oxygen level, grip pressure, alcohol sensed on driver's breath body temperature and the like. Other examples of driver physiological factors include driver seat position, seat belt usage, seat belt position (used in part to determine if driver is fully seated or leaning forward, etc), and driver position within the seat, driver seat reclining position and the steering member position such as tilt/telescoping adjustment. Drivers also have base and/or historical factors such as driver experience indicators (e.g. normal driving patterns, preferences, skill level, relevant training and safety record).

Representative examples of factors relating to the vehicle and its operation include whether the vehicle is in reverse, in park, accelerating, decelerating, traveling at high speed, negotiating a turn, swerving, making an extended length turn, turning at relatively high velocity, traveling without direction correction (one possible indication of a drowsy driver as noted previously), whether there is fire or smoke in the vehicle, and whether the engine has stalled (as may be indicated by movement of the vehicle without continuing engine operation), tire pressure, whether the vehicle has rolled-over or been inverted, is climbing or descending a hill, if the airbags have deployed, and if the ABS, traction control, or stability systems have been activated. Base or historical vehicle factors include whether the vehicle has driver assistance systems like ABS, adaptive cruise control, traction control, ESP/stability or other electronic steering assist, four-wheel drive, all-wheel drive and the like, as well as historical data indicative of service condition, tire wear, brake wear, and habits/skills of the driver within said vehicle, driving application (e.g. recognizing difference in usage between a family sedan and a police cruiser), minimum braking distance, maintenance history.

Representative examples of environmental factors include exterior conditions such as weather (rain, snow, bright sunshine, etc), time of day (e.g. night or day), road conditions (e.g. wet, icy, etc), proximity to other vehicles, proximity to known obstacles, and the like. Further representative examples of environmental factors preferably also include interior conditions such as loud noises like a crying baby or barking dog, and the presence of cigarette smoke in the vehicle which can be an irritant to at least some drivers.

Representative examples of regulatory factors include speed limits, traffic signals, and specified rules for certain roads and the like.

The factors are monitored and compared to set or determined thresholds to determine the level of driver attention required to safely control the vehicle. The system controls all machine to man communications (e.g. phone, vehicle alarms/indicators, computer, PDA, etc) to and from the driver as a function of the monitored factors that provide an indication of the level of attention required by the driver to safely operate and control the vehicle. Conditions and factors that require a higher level of driver attention cause the system to permit less or no communication to and from the driver. This reduces driver distraction and frees the driver's senses so that they may be employed to ensure safe vehicle operation. The factors and conditions are assessed, rated and/or compared to threshold values. A single factor over a threshold value may be sufficient to cause the system to restrict, suppress or disable communications to and from the driver. Also, several factors, even if no single factor is over its threshold value, can cause the system to restrict communications to and from the driver. In other words, the relative severity of a combination of individual conditions encountered by the driver can cause an aggregate value over a threshold wherein further driver distraction is not desirable, so the system prevents communications to and from the driver in such situations. For example, the presence of water on the driving surface may not by itself be enough to cause the computer to restrict communications to and from the driver, but wet roads in combination with another condition like unusual driver physiological symptoms indicating increased driver stress, may be enough to cause the system to restrict or prevent communications with the driver. In this manner, the factors and conditions signals can be considered to be rated or valued with the ratings and values weighted and combined, or otherwise statistically rendered to provide an overall assessment of the driving conditions. Further, certain of the factors can be made dependent on other factors. For example, without limitation, the presence of water or ice on the road may be used to alter the threshold value or level relating to proximity to other vehicles since an increased stopping distance may be required when driving in such road conditions. Such diminished road conditions can also lower the acceptable speed or acceleration parameters.

Certain of the thresholds may be set or predetermined prior to installation of the system, and other thresholds may be learned or determined through use of the system in accordance with driver experience, history, preferences, as well as vehicle features, information and history. For example, one vehicle may be able to stop faster than another, so the threshold for the proximity to other vehicles can be different between the vehicles as the one vehicle can travel closer to other vehicles and safely stop in an emergency. Likewise, a driver that frequently travels on expressways at relatively high speeds in relatively close proximity to other vehicles may be permitted more leeway for communications in such conditions than a driver that rarely or never travels in that manner. Likewise, a driver that frequents a certain geographic region may be given more leeway for communications in that region than a driver outside of his normal driving region since that driver may be distracted trying to navigate in unknown regions. Likewise, drivers in vehicles with ABS, or other advanced safety features may be permitted greater leeway in communications that drivers in vehicles without such features in situations and conditions where these features improve the vehicle response and safety. Accordingly, the thresholds for individual driving factors and conditions, or combinations of factors and conditions, can be customized based on the driver and the vehicle. If desired, the driver profile can be continually updated based on feedback obtained as to the driver's driving habits, and such profile updates can be made based on real-time data, or statistical analysis.

Additionally, the various communications or inputs/outputs to and from the devices in the vehicle may detract differently from the driver's attention and ability to safely control the vehicle. Making a phone call may involve searching a database of names and phone numbers, dialing numbers, using voice activation or other tasks, and may be more driver intensive than answering a phone call of being alerted of a vehicle fault (like low washer fluid, low fuel level, etc). The level of driver involvement and/or potential distraction from the various communications devices, both when initiated by the driver and when communicated to the driver (where appropriate), is another factor that can be assessed to determine the level and timing of any restriction of the driver communications. So under at least some conditions certain communications to and from the driver may be restricted or suppressed while others are permitted.

When the assessed risk to the driver and other vehicles and things, is borderline (i.e. higher than normal risk, but not severe), the system may provide recommendations to the driver as to how to overcome any communications restriction, if doing so will not cause undue driver distraction. For example, without limitation, if the vehicle is traveling too fast to safely receive an incoming or make an outgoing telephone call, the system may inform the driver (either audibly or visually) to slow down to enable the telephone. Hence, the driver is permitted access to the communications if corrective action is taken (avoiding swerving, slowing down, driving within speed limit, increasing distance between adjacent vehicles, etc). Similarly, a time-delay may be initiated after certain conditions are sensed, like unusually rapid braking, or swerving, or the like to prevent immediate inputs to or outputs from the device as soon as the vehicle and driver factors are within allowable limits. This time-delay permits the driver to regain composure and assess the current situation prior to use of or interruption from the various input/output devices.

The system preferably permits significant customization by the driver. The driver can preferably select the type of feedback provided by the system (audible, visual, tactile, etc), and when the feedback is provided (e.g. not during telephone calls, etc). The driver can also preferably customize the voice used in any voice feedback, or the tones, tactile response, or visual display, if any. This customization helps to reduce distraction or annoyance caused to the driver by the system feedback, and thereby helps to maintain driver concentration and awareness of the vehicle and the environment.

The system preferably also provides a cross-check of at least some sensed conditions, such as vehicle operational conditions, to ensure that individually but related conditions are in agreement. For example, the system may compare sensed RPM or engine rotational speed with the throttle or velocity sensor and transmission sensor to ensure the sensed vehicle operating characteristics are all in agreement. If they are not, it could indicate a vehicle fault (e.g. slippage of the transmission or the tires on the road) and the system applies a more stringent restriction of the input/output devices as appropriate. The control system can be disabled by the user, but preferably, to do so requires the user to activate some signal viewable by others that indicates the vehicle is operating out of normal constraints. One readily available

mechanism that satisfies the above is the emergency or hazard lights provided on most vehicles and operable to cause several exterior lights to repeatedly flash indicating vehicle distress. Accordingly, in some implementations, the control system may be overridden by activating the vehicle emergency lights.

The system preferably includes a learning mode wherein certain routine or unusual events, conditions, locations, phone numbers and the like are stored for later access. In the learning mode the microprocessor or other controller may accept an input from a driver to store an address of a particular location, or may inquire if the driver wants the address stored wherein the driver may respond no or yes by activating the toggle switches on the steering member. The address can be stored as a function of its geographic location (latitude/longitude) for later access to, for example, facilitate finding that location at a later date, perhaps with the assistance of a navigation system. The learning mode could also be used to call out other features the driver may want to be reminded or warned of in the future, such as school zones, railroad crossings, changing speed limits, etc. The system could prompt or notify the driver when the vehicle is approaching such stored features as a function of the vehicle heading and geographic location. The learning mode provides increased customization ability to the driver, and can help build the driver's profile/driving habits and characteristics. The learning mode can be activated and deactivated by the driver, and may be preset for automatic use upon initial use of the system and for a certain time thereafter, subject to the ability of the driver to manually override such setting.

The system preferably also has a training mode wherein the system provides increased assistance to a driver to familiarize the driver with usage and various characteristics and features of the system. In training mode, the system may assist driver selection of applications by instructing or notifying the driver of the manner by which applications can be selected, as well as choices within an application. Training mode may also provide increased feedback of the reasons for suppression of any input/output device, and perhaps, ways to avoid such suppression (reduce vehicle speed, avoid harsh accelerations, etc). The training mode can be activated and deactivated by the driver, and may be preset for automatic use upon initial use of the system and for a certain time thereafter, subject to the ability of the driver to manually override such setting.

Predictive algorithms can be used to determine certain driving conditions based on driver habits and history, as well as data from research, or other drivers and the like. For example, the vehicle may perform certain maneuvers prior to exiting from a freeway to an off-ramp, or entering a freeway from an on-ramp. The vehicle may decelerate and gradually turn onto an off-ramp, and then further decelerate and negotiate a sharp turn on the off-ramp, or preform some other maneuvers from which the system can predict that the driver is exiting a freeway. From this prediction, the system may increase the restriction of telematics or other communications with the driver. Similar predictive behaviors or maneuvers may be detected for entering a freeway, and the system may likewise increase restrictions of communications.

Therefore, in at least one presently preferred embodiment of the safety control system for vehicles, the system includes a communication device having at least one of an input accessible from within the vehicle and an output communicated within the vehicle, at least one sensor operable to sense at least one condition related to vehicle operation, and

a controller communicated with the sensor and the communication device to selectively suppress at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold. The communication device can be at least any of those previously mentioned herein, for example without limitation, a telephone, PDA, computer, vehicle alarm or indicator, navigation system, DVD player/recorder, CD player/recorder, and other electronic and/or telematic or other input/output devices accessible by the driver, and/or providing information or some communication to the driver. The sensors can also be at least any of those previously mentioned herein, for example without limitation, the physiological sensors, safety switches, toggle switches, vehicle operational sensors (e.g. steering, acceleration, deceleration, etc). And the controller can be at least any of those previously mentioned, for example without limitation, a stand alone unit with built-in microprocessor, an existing vehicle processor or control unit, and the like, and can be arranged to communicate with the driver and/or other devices as set forth herein.

While it will be appreciated, therefore, that while the invention has been described with respect to one preferred embodiment, many other variations, modifications and applications of the invention may be made. For example, without limitation, while the preferred embodiment requires the driver to maintain both hands on the steering wheel to initiate, receive and maintain communications or system access, other schemes may be used. For example, the system may require presence of two hands on the steering wheel to initially activate the system, and perhaps provide initial input (e.g. to place a telephone call and the like), but after such activation or initial input, the system may permit one hand to be removed from the steering wheel. This would facilitate, among other things, shifting a manual transmission. Shifting a manual transmission can be accommodated in the scheme requiring both hands on the steering wheel by permitting one hand to leave the steering wheel when the clutch is sensed as being activated to shift gears. Of course, other modifications, substitutions and applications can be accomplished in view of this disclosure.

The invention claimed is:

1. A safety control system for vehicles comprising:

a telematic device running at least one software application and having at least one input and at least one output;

at least one sensor operable to sense at least one condition related to a driving environment and data providing information indicating at least one distracting feature for at least one software application;

a controller in communication with the sensor and the data and the software application and the telematic device, the controller configured to prevent the at least one application output from being provided to the driver in the original format of the at least one output and to provide the at least one output to the driver in a different format, and

wherein the controller controls when at least one input into the software application and at least one output from the software application are provided to the driver so that prior to permitting the driver to access the input or prior to providing an output from the software application on the telematic device to the driver, the controller determines whether said at least one condition is within a threshold and permits the driver to access said input or provides said output to said driver only when said at least one condition is within the threshold.

2. The safety control system of claim **1** wherein:

the software applications include at least one of a telephone application, a pager application, a vehicle indicator application providing an audible, text to speech, or visual output, a navigation application, an audio application, a video application, a voice recorder application, a wireless communication application permitting access to internet, WAN or LAN network server, an email application, an SMS application, a text messaging application, a media messaging application, digital address book application, book reading application, a digital calendar application, a planner application, a digital assistance application, a navigation application and communication device including at least a pager, a telephone, a global location sensor, a temporal sensor, an optical sensor, a heading sensor, a bearing sensor, and an altitude sensor;

the at least one sensor operable to sense at least one condition related to a driving environment, and to provide data indicating at least one distracting feature for the at least one software application;

and wherein the controller prevents said at least one application output from being provided to the driver in the original format of said at least one output and provides said at least one output to the driver in a different format.

3. The safety control system of claim **1** wherein the controller resides on at least one of portable multifunction telematic device, a built in telematic controller or a remote controller in communication with the vehicle, the driver, the software application, the input and the output to the driver.

4. The safety control system of claim **1** wherein the software application resides on at least one of portable multifunction telematic device, a built in telematic controller or a remote controller in communication with the vehicle, the driver, the software application, the input and the output to the driver.

5. The safety control system of claim **1** wherein the controller resides on at least two or more of a portable multifunction telematic device, a built it telematic controller or a remote controller in communication with the vehicle, the driver, the software application, the input and the output to the driver.

6. The safety control system of claim **1** wherein the software application resides on at least two or more of portable multifunction telematic device, a built in telematic controller or a remote controller in communication with the vehicle, the driver, the software application, the input and the output to the driver whereas such communication is carried out wirelessly via LAN, WAN, Cellular or WIFI.

7. The safety control system of claim **2** wherein the data indicating at least one distracting feature resides on at least one or more of a portable multifunction telematic device, a built in telematic controller or a remote controller in communication with the vehicle, the driver, the software application, the input and the output to the driver, whereas such communication is carried out wirelessly via LAN, WAN, Cellular or WIFI.

8. The safety control system of claim **2** wherein the driving environment data provided to the system includes at

least one of a vehicle data, traffic data, driver related data, applications in use data, other vehicles in traffic data, GPS data, location data, heading data, bearing data, navigation data, passengers data, pedestrian data, weather data, infrastructure data, location data and temporal data related to the driving environment.

9. A safety control system for vehicles, including:

a telematic device running at least one software application and having at least one of an input and at least one output;

at least one sensor operable to sense at least one condition related to driving environment and data providing information indicating at least one distracting feature for at least one software application;

a controller in communication with the sensor and the data and the software application and the telematic device, wherein the controller prevents said at least one application output from being provided to the driver in the original format of said at least one output, and provides said at least one output to the driver in a different format, and

wherein the controller controls when at least one input into the software application and at least one output from the software application are provided to the driver so that prior to permitting the driver to access said input or prior to providing an output from the software application on the telematic device to the driver, the controller determines whether said at least one condition is within a threshold and permits the driver to access said input or provides said output to said driver only when said at least one condition is within the threshold.

10. A safety control system for driving residing on a portable communication telematic device, the safety control system comprising:

a portable communication device running at least one software application and having at least one of an input and at least one output;

at least one sensor operable to sense at least one condition related to driving environment and data providing information indicating at least one distracting feature for at least one software application;

a controller in communication with the sensor and the data and the software application and the telematic device, wherein the controller prevents said at least one application output from being provided to the driver in the original format of said at least one output, and provides said at least one output to the driver in a different format, and wherein the controller controls when at least one input into the software application and at least one output from the software application are provided to the driver so that prior to permitting the driver to access said input or prior to providing an output from the software application on the telematic device to the driver, the controller determines whether said at least one condition is within a thresholds and permits the driver to access said input or provides said output to said driver only when said at least one condition is within the threshold.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORD MOTOR COMPANY,
Petitioner,

v.

SAFE DRIVING TECHNOLOGIES LLC,
Patent Owner.

IPR2021-01446
Patent 9,047,170 B2

Before RYAN H. FLAX, BRENT M. DOUGAL, and
ALYSSA A. FINAMORE, *Administrative Patent Judges.*

FINAMORE, *Administrative Patent Judge.*

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

ORDER
Granting Petitioner's Motion to Exclude
37 C.F.R. § 42.64(c)

I. INTRODUCTION

Ford Motor Company ("Petitioner") filed a Petition (Paper 2, "Pet.") requesting an *inter partes* review of claims 1–4, 6, 10, 12–17, 19–21, and 31 of U.S. Patent No. 9,047,170 B2 ("the '170 patent") (Ex. 1001).[1] Pet. 1. We issued a Decision (Paper 11, "Inst. Dec.") granting institution of an *inter partes* review.

During trial, Safe Driving Technologies LLC ("Patent Owner") filed a Response (Paper 13, "PO Resp."). Petitioner filed a Reply (Paper 16, "Reply"),[2] and Patent Owner filed a Sur-reply (Paper 17, "Sur-reply").

Petitioner filed a Motion to Exclude (Paper 21, "Mot."). Patent Owner filed an Opposition (Paper 22, "Opp."), and Petitioner filed a Reply (Paper 23).

Oral argument took place January 25, 2023. We entered the transcript (Paper 27, "Tr.") into the record.

This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we conclude Petitioner has proven, by a preponderance of the evidence, that claims 1–4, 6, 10, 12–14, 16, 17, 19–21, and 31 are unpatentable, but has not proven, by a preponderance of the evidence, that claim 15 is unpatentable. Furthermore, we grant Petitioner's Motion to Exclude.

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[1] Claims 5, 7–9, 11, 18, and 22–30 are not challenged in this proceeding.

[2] On the same day, Petitioner filed a Reply (Paper 15) and a Corrected Reply (Paper 16). References herein to Petitioner's Reply are to the Corrected Reply.

II. BACKGROUND

A. REAL PARTIES-IN-INTEREST

Petitioner identifies itself as a real party-in-interest. Pet. viii. Patent Owner identifies itself and General Patent Corporation as real parties-in-interest. Paper 4, 1.

B. RELATED MATTERS

Petitioner identifies the following district court action involving the '170 patent as a related matter: *Safe Driving Technologies LLC v. Ford Motor Company*, No. 1-21-cv-00064 (D. Del. filed Jan. 21, 2021) ("the related district court litigation"). Pet. viii. Patent Owner also identifies the related district court litigation and further identifies the following Board proceedings as related matters: IPR2021-01341 concerning U.S. Patent No. 9,713,994 B2; IPR2021-01353 concerning U.S. Patent No. 10,532,709 B2; and IPR2022-00086 concerning U.S. Patent No. 8,301,108 B2. Paper 4, 1. The parties indicate that the patents involved in these Board proceedings are also at issue in the related district court litigation. Pet. viii; Paper 4, 1.

C. THE '170 PATENT

The '170 patent issued on June 2, 2015, from an application filed on October 29, 2012. Ex. 1001, codes (22), (45). The '170 patent claims priority as a divisional application to U.S. Patent Application No. 10/838,708, which is a continuation of U.S. Patent Application No. 10/287,299, which is a continuation of U.S. Patent Application No. 10/279,447, filed on October 24, 2002. *Id.* at code (60). The '170 patent also claims priority to U.S. Provisional Application No. 60/390,877, filed June 21, 2002, and U.S. Provisional Application No. 60/336,293, filed October 24, 2001. *Id.* There is no meaningful dispute here that the '170

patent is entitled to priority to the earliest provisional application. *See, e.g.*, Pet. 3 (Petitioner asserting that the ordinarily skilled artisan would be someone as of October 24, 2001).

The ’170 patent is titled “Safety Control System for Vehicles.” Ex. 1001, code (54). The ’170 patent explains that “[o]ne potentially dangerous condition is the use of a vehicle telephone by the vehicle driver while driving the vehicle.” *Id.* at 1:28–29. The ’170 patent further explains that

> [t]he use of telematics in general and particularly cellular telephones by drivers while driving has been found to increase the possibility of an accident since such a telephone not only diverts the driver’s attention from driving, but also generally requires the use of at least one of the driver’s hands and distract the driver’s eyes from the road and traffic.

Id. at 1:29–35.

With this background, the ’170 patent describes the invention as “safety control systems for vehicles to reduce driver distraction, avoiding potentially dangerous conditions tending to produce accidents.” Ex. 1001, 1:21–24. Such a safety control system includes

> a communication device having at least one of an input accessible from within the vehicle and an output communicated within the vehicle, at least one sensor operable to sense at least one condition related to vehicle operation, and a controller communicated with the sensor and the communication device to selectively suppress at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold.

Id. at 2:22–30.

According to the ’170 patent, “[o]ne example of a hazardous situation avoided by the control system . . . is the use of the vehicle telephone in

certain situations wherein a making of a telephone call . . . or the receiving of an incoming call . . . may distract the driver and increase the possibility of an accident . . . .” Ex. 1001, 5:38–44. “Similar increased risk can result from the driver changing vehicle controls like temperature settings, or interacting (e.g., inputting or receiving output) with other telematics such as e-mail, radio, CD, DVD, navigation system, incoming page or the like.” *Id.* at 5:44–48. The ’170 patent explains that “[i]n such cases, the vehicle telephone, or other telematics and/or other input/output devices are suppressed and no incoming or outgoing signals are allowed to distract the driver.” *Id.* at 5:48–51.

Figure 1, reproduced below, illustrates a vehicle having a safety control system.

FIG - 1

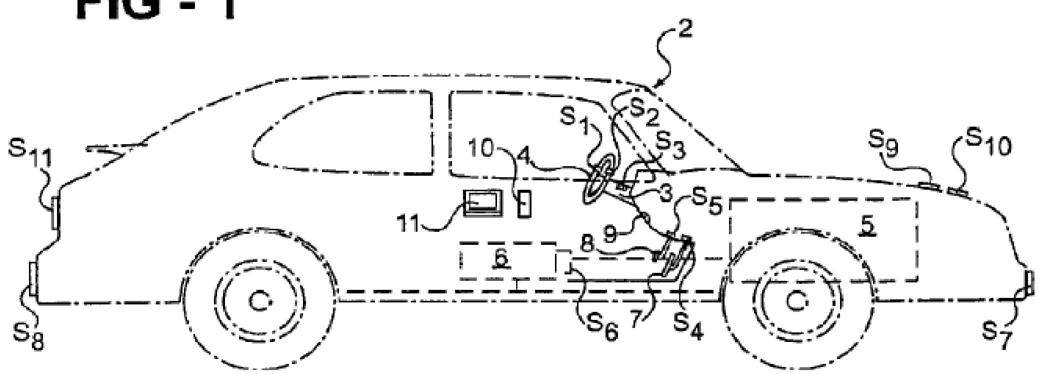

Figure 1 is a schematic illustration of vehicle 2 equipped with a safety control system. Ex. 1001, 5:7–9, 5:27–28. Vehicle 2 includes steering mechanism 3, steering wheel 4, motor or engine 5, transmission or other torque converting means 6, acceleration pedal 7, braking pedal 8, one or more visual indicator and audio alarms 9, cellular telephone 10, and computer 11. *Id.* at 6:4–14. The safety control system includes a plurality

of sensors S_1–S_{11} for sensing conditions regarding the vehicle driver, the vehicle itself, and the environment. *Id.* at 6:24–27. Sensors S_1 and S_2 sense that the driver's hands are present on both sides of steering wheel 4. *Id.* at 6:29–30, 7:37–39. Sensor S_3 is on steering mechanism 3 to sense changes in the steering direction and actuation of the turning indicator. *Id.* at 6:30–33. Sensor S_4 senses the condition of acceleration pedal 7, and sensor S_5 senses the condition of braking pedal 8. *Id.* at 6:40–42. Sensor S_6 senses the condition of transmission 6. *Id.* at 6:42–44. Sensors S_7 and S_8 sense the proximity of the vehicle with respect to another vehicle. *Id.* at 6:45–47. Sensor S_9 senses darkness or activation of the headlight, and sensor S_{10} senses weather conditions and the activation of wipers or headlight wipers. *Id.* at 6:47–51. Sensor S_{11} senses whether the turn indicators of the vehicle signal for a turn or a change of lanes. *Id.* at 9:15–17.

The safety control system further includes microprocessor 20. Ex. 1001, 9:31–33. Figure 3, reproduced below, illustrates microprocessor 20 and its inputs and outputs.

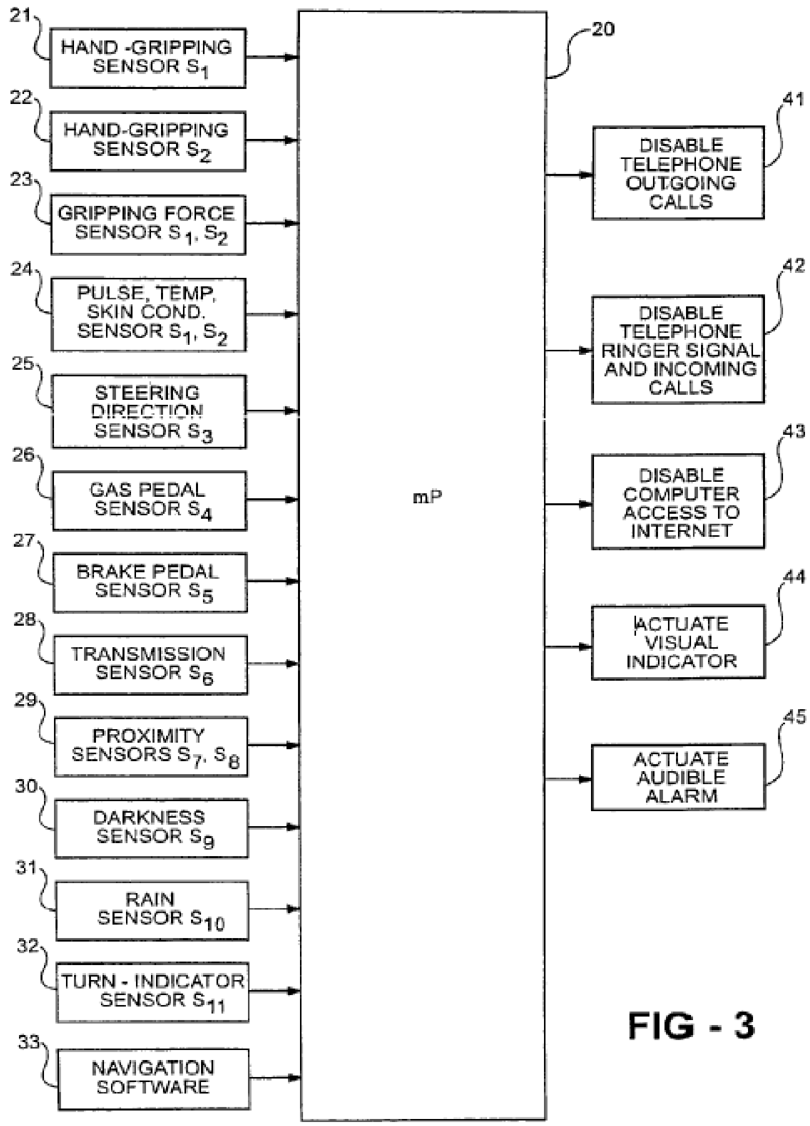

FIG - 3

Figure 3 is a block diagram illustrating the main components the safety control system. *Id.* at 5:12–13. Figure 3 schematically indicates the inputs to microprocessor 20 with blocks 21–33 and the outputs from microprocessor 20 with blocks 41–45. *Id.* at 9:31–35. As denoted in blocks 21–32, microprocessor 20 receives inputs from sensors S_1–S_{11}. *Id.* at 9:36–46, 9:59–60, 10:11–20. Microprocessor 20 also receives input from navigation software, as shown in block 33. *Id.* at 10:21–24. The outputs from microprocessor 20 include control signals. *Id.* at 13:3–4. Block 41

shows a control signal effective to disable the telephone from making outgoing calls, and block 42 shows a control signal effective to disable the telephone from ringing and receiving incoming calls. *Id.* at 13:4–8. Block 43 shows a control signal effective to disable the computer from accessing the Internet. *Id.* at 13:8–11. Blocks 44 and 45 show a control signal effective to actuate a visual indicator and an audible alarm, respectively. *Id.* at 13:11–13.

The operation of the safety control system is shown in Figure 4, reproduced below.

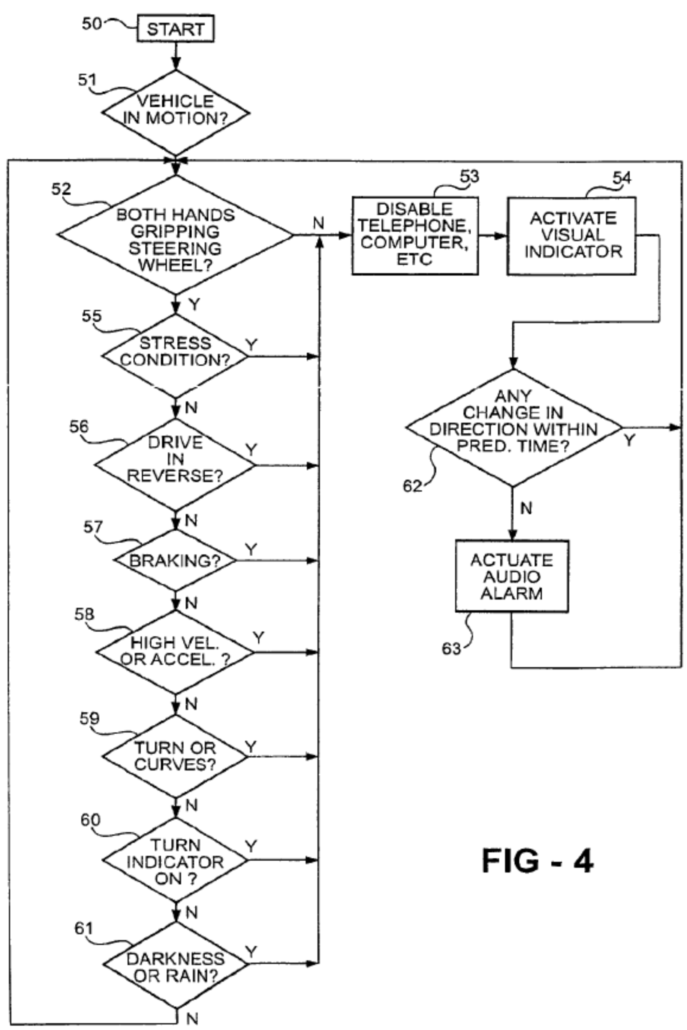

FIG - 4

Figure 4 is a flowchart illustrating the operation of the safety control system. Ex. 1001, 5:14–15, 14:19–20. As shown by blocks 50 and 51, the safety control system is operational when the vehicle is in motion. *Id.* at 14:21–22. In block 52, the safety control system determines whether the driver's hands are properly placed on steering wheel 4 so as to actuate sensors S_1 and S_2. *Id.* at 14:28–30. If the driver's hands are not gripping the steering wheel, the safety control system disables the telephone and computer and activates a visual indicator, as shown in blocks 53 and 54. At block 55, if sensors S_1 and S_2 sense the driver's hands on steering wheel but also sense a stress condition indicated by, for example, an unduly high gripping force, the safety control system similarly disables the telephone and computer and activates a visual indicator, as shown in blocks 53 and 54. *Id.* at 14:30–41.

After sensing conditions regarding the vehicle driver, the safety control system determines the conditions of the vehicle. *Id.* at 14:42–43. In block 56–61, respectively, the safety control system determines whether the vehicle is traveling in reverse based on input from sensor S_6, braking according to input from sensor S_5, traveling at or over a predetermined high velocity according to input from sensor S_6, executing a curve or a turn based on input from sensor S_3, about to execute a turn according to sensor S_{11}, or traveling in the dark as indicated by sensor S9 or in the rain as indicated by sensor S_{10}. *Id.* at 14:43–51. If the safety control system senses any of these conditions, the safety control system disables the telephone and computer and activates a visual indicator, as shown in blocks 53 and 54. *Id.* at 14:51–54. As also shown in Figure 4, after the safety control system disables the telephone and computer and activates a visual indicator, the safety control system determines whether there has been any change in the

steering direction within a predetermined amount of time, as denoted in block 62. If there has been no change, the safety control system activates an audible alarm, as denoted in block 63, to alter the driver to a possible drowsiness or dozing condition. *Id.* at 14:55–59.

The safety control system "monitors and analyzes a plurality of factors that can affect the safe travel of the vehicle, either alone or in combination with one or more other factors." Ex. 1001, 18:14–16. "Such factors relate generally to the vehicle, the driver, and the environment," and "[t]he driver has various communication factors, physiological factors, and preferences/habits, skills and historical factors." *Id.* at 18:16–19. Examples of driver communication factors include "input and output features of various devices communicated with the driver such as telephones, pagers, PDA's, computers, fax machines, GPS devices, navigation systems and displays, radios, CD players, CB's, video monitors, and other telematic or informational devices." *Id.* at 18:30–34.

D. CHALLENGED CLAIMS

Petitioner challenges claims 1–4, 6, 10, 12–17, 19–21, and 31 of the '170 patent. Pet. 1. Claims 1 and 31 are independent. Ex. 1001, 22:55–23:6, 25:4–18. Independent claims 1 and 31, reproduced below with Petitioner's labels for the elements, are illustrative of the claimed subject matter.

> [1.0] 1. A method for controlling a telematic device in a vehicle operated by a driver, the telematic device having at least one of an input accessible from within the vehicle and at least one output communicated within the vehicle, the output having an original format and a format different than the original format, the method comprising:
>
> [1.1] sensing movement of the telematic device;

> [1.2] comparing movement of the telematic device to a threshold;
>
> [1.3] preventing said at least one output from being communicated within the vehicle in the original format of said at least one output when movement of the telematic device is at or above the threshold;
>
> [1.4] providing said at least one output to the driver in the format different than the original format when movement of the telematic device is at or above the threshold; and
>
> [1.5] permitting the driver to access said input or providing said output to said driver in the original format when movement of the telematic device is below the threshold.
>
> [31.0] 31. A method for controlling a telematic device in a vehicle operated by a driver, the telematic device having at least one of an input interface accessible from within the vehicle, the input interface having an original input interface and an alternative input interface different than the original input interface, the method comprising:
>
> [31.1] determining movement of the telematic device or vehicle;
>
> [31.2] comparing the movement of the telematic device to a threshold;
>
> [31.3] changing said input interface to the alternative input interface when the movement of the telematic device or vehicle is at or above the threshold; and
>
> [31.4] changing said input interface to the original input interface when the movement of the telematic device or vehicle is below the threshold.

Id.

E. ASSERTED GROUNDS AND EVIDENCE

Petitioner asserts the following four grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. §[3]	Reference(s)[4]
1, 2, 6, 10, 12–15, 20	103(a)	Arnold[5]
1–4, 10, 14, 16, 17, 19–21, 31	103(a)	Hardouin[6]
13	103(a)	Hardouin, Trauner[7]
4	103(a)	Hardouin, Krüger[8]

Pet. 2–3.

[3] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended certain sections of this statute, including §§ 102 and 103, and the effective date of the relevant amendment is March 16, 2013. The '170 patent issued from an application filed on October 29, 2012 (Ex. 1001, code (22)), which is before the effective date of the AIA amendment. We therefore apply the pre-AIA version of the statute, but the applicable version of the statute does not affect this Decision.

[4] For all of the asserted grounds, Petitioner argues the claimed subject matter would have been obvious over the references and the knowledge of an ordinary artisan. Pet. 2–3. Petitioner, however, does not rely on the knowledge of an ordinary artisan to teach a claim limitation but, rather, to explain how the asserted references teach the claim limitations. *See* Pet. 6–80. As Petitioner relies on the knowledge of an ordinary artisan only to elucidate the teachings of the references, we do not consider Petitioner to be relying on the knowledge of an ordinary artisan apart from the references. *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) ("[A] prior art reference must be 'considered together with the knowledge of one of ordinary skill in the pertinent art.'" (quoting *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)); *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991) (explaining that testimony from those skilled in the art may be used to explain the meaning of a reference).

[5] Arnold et al., WO 98/43192, published Oct. 1, 1998 ("Arnold") (Ex. 1036).

[6] Hardouin, US 6,311,078 B1, issued Oct. 30, 2001 ("Hardouin") (Ex. 1027).

[7] Trauner et al., US 2002/0070852 A1, published June 13, 2002 ("Trauner") (Ex. 1029).

[8] Krüger et al., US 7,711,355 B1, issued May 4, 2010 ("Krüger") (Ex. 1026).

In support of these asserted grounds of unpatentability, Petitioner submits the Declarations of Scott Andrews (Ex. 1003; Ex. 1046).

Patent Owner submits Declarations of John Peck (Ex. 2027; Ex. 2031). Petitioner deposed and cross-examined Mr. Peck and submits a transcript of Dr. Peck's deposition (Ex. 1045).

III. ANALYSIS OF ASSERTED GROUNDS OF UNPATENTABILITY[9]

A. APPLICABLE LEGAL STANDARDS

"In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

As set forth above in section II.E, each of Petitioner's asserted grounds of unpatentability is premised on the claimed subject matter being obvious under 35 U.S.C. § 103(a). Pet. 2–3. The Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), reaffirmed the framework for determining obviousness set forth in *Graham v. John Deere Co.*, 383 U.S. 1 (1966). The *KSR* Court summarized the four factual inquiries set forth in *Graham* (383 U.S. at 17–18) that are applied in

[9] Although we address certain of Patent Owner's arguments as unpersuasive, this is in the context of each party's arguments and the record as a whole, and we do not shift the burden of proof on patentability from Petitioner. *See Essity Prof'l Hygiene N. Am. LLC v. Cascades Canada ULC*, 811 Fed. App'x 643 (Fed. Cir. 2020).

determining whether a claim is unpatentable as obvious as follows: (1) determining the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims at issue; (3) resolving the level of ordinary skill in the art; and (4) considering objective evidence indicating obviousness or non-obviousness.[10] *KSR*, 550 U.S. at 406.

An obviousness analysis must include a reason, based upon rational underpinnings, why a person of ordinary skill would have been motivated to modify the prior art to achieve the claimed invention. *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) ("To satisfy its burden of proving obviousness, a petitioner . . . must . . . articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness." (citing *KSR*, 550 U.S. at 418)). Nonetheless, "a disclosure that anticipates under § 102 also renders the claim invalid under § 103, for 'anticipation is the epitome of obviousness.'" *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983) (quoting *In re Fracalossi*, 681 F.2d 792 (CCPA 1982)); *see also Application of Pearson*, 494 F.2d 1399, 1402 (CCPA 1974) ("[T]his court has sanctioned the practice of nominally basing rejections on § 103 when, in fact, the actual ground of rejection is that the claims are anticipated by the prior art. The justification for this sanction is that a lack of novelty in the claimed subject matter, e.g., as evidenced by a complete disclosure of the invention in the prior art, is the 'ultimate or epitome of obviousness.'" (citations and footnote omitted)).

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[10] In this proceeding, there is no evidence pertaining to objective indicia of non-obviousness.

B. LEVEL OF ORDINARY SKILL IN THE ART

The level of ordinary skill in the art is "a prism or lens" through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The prior art may reflect the level of ordinary skill in the art. *Id.*

Petitioner asserts:

> An ordinary artisan would have been a person having, as of October 24, 2001, a Bachelor's degree in Electrical Engineering, Mechanical Engineering, Computer Engineering, or Computer Science, or an equivalent degree with at least two years of experience in electronic user interface systems and vehicle sensor systems or related technologies. Additional education may substitute for lesser work experience and vice-versa.

Pet. 3 (citing Ex. 1003 ¶ 40). Patent Owner does not oppose Petitioner's proposed definition and puts forth essentially the same definition for the level of ordinary skill in the art as Petitioner. PO Resp. 16 (citing Ex. 2027 ¶¶ 20–21).

We adopt Petitioner's unopposed definition of the level of ordinary skill in the art. We find, on the record, that this definition is consistent with the level of ordinary skill reflected in the asserted references and the '170 patent.

C. CLAIM CONSTRUCTION

We interpret a claim "using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b)." 37 C.F.R. § 42.100(b) (2023). Under this standard, we construe the claims "in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." *Id.*

"[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc).

> [T]he court looks to "those sources available to the public to show what a person of skill in the art would have understood disputed claim language to mean." Those sources include "the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art."

Id. at 1314 (citations omitted) (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)). "[T]he claims themselves provide substantial guidance as to the meaning of particular claim terms" and "[t]he context in which a term is used in the asserted claim can be highly instructive." *Id.* Claims, however, "must be read in view of the specification, of which they are part." *Id.* (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995). "[T]he Specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). Extrinsic evidence "can shed useful light on the relevant art," but "it is 'less significant than the intrinsic record in determining "the legally operative meaning of claim language."'" *Id.* at 1317 (quoting *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 862 (Fed. Cir. 2004)). "[E]xtrinsic evidence in the form of expert testimony can be useful to a court for a variety of purposes, such as . . . to establish that a

particular term in the patent or the prior art has a particular meaning in the pertinent field." *Id.* at 1318. Furthermore,

> [b]ecause dictionaries, and especially technical dictionaries, endeavor to collect the accepted meanings of terms used in various fields of science and technology, those resources have been properly recognized as among the many tools that can assist the court in determining the meaning of particular terminology to those of skill in the art of the invention.

Id.

1. "telematic device"

Every clause of independent claim 1 includes the term "telematic device." Ex. 1001, 22:55–23:6. Similarly, every clause of independent claim 31 includes this term. *Id.* at 25:4–18. Dependent claims 2, 3, 6, 9–11, 14, 16, and 18 also recite this term, although some use the plural "telematics," interchangeably with "telematic."[11] *See id.* at 23:7–24:10.

[11] In view of the record, and the parties' arguments, we understand that the terms "telematic device," "telematics device," and "telematic" are synonymous. For example, independent claim 1 recites a "telematic device," and claims 3, 6, 9, 10, and 16, which depend from independent claim 1, recite "the telematics device." Ex. 1001, 22:55–23:6, 23:15–19, 23:27–29, 23:39–45, 23:66–24:2. Similarly, the Specification describes certain devices as "telematic devices," "telematics devices," and "telematics." *See, e.g., id.* at 5:47–48 ("telematics such as e-mail, radio, CD, DVD, navigation system, incoming page or the like"), 15:2 ("a portable Telematic device such as a cell phone, blackberry, PDA, etc."), 16:65 ("a portable telematics device such as a cellular phone"), 17:17–18 ("a telematic device (e.g., telephone, PDA, computer, and the like)"), 18:30–34 ("various devices communicated with the driver such as telephones, pagers, PDA's, computers, fax machines, GPS devices, navigations systems and displays, radios, CD players, CB's, video monitors, and other telematic or informational devices"); *see also* Ex. 1003 ¶ 46 (Mr. Andrews testifying that the '170 patent uses the terms "telematics" and "telematic device" interchangeably). Moreover, during oral argument, Patent Owner confirmed

In its Petition, Petitioner does not provide an express construction for the claim term "telematic device." *See* Pet. 5 (arguing "no claim construction is necessary at this time"). Nonetheless, in asserting that Arnold's travel guide system discloses the recited telematic device, Petitioner points to the Specification's description of a "telephone, PDA, computer, and the like" as examples of a telematic device. Pet. 7 (citing Ex. 1001, 17:14–20; Ex. 1003 ¶¶ 129–131). Similarly, in contending that Hardouin's wireless telephone discloses the recited telematic device, Petitioner relies on the Specification's description of a telephone as a type of telematic device. *Id.* at 36 (citing Ex. 1001, 6:13–17; Ex. 1003 ¶¶ 217–220), 64 (citing Ex. 1001, 6:13–17; Ex. 1003 ¶¶ 309–312).

In its Response, Patent Owner ostensibly acknowledges that a telephone or a computer could be a telematic device, but contends that a telematic device must have certain functionalities and multimedia outputs. To wit, Patent Owner argues "[a] telematics device in accordance with the Plain and Ordinary meaning of this term and as confirmed by the [']170 [S]pecification is a central multifunction device that integrates together the features of information, communication, computing, and entertainment technologies." PO Resp. 10 (citing Ex. 1001, 1:18–24, 3:29–35, 17:15–18, Fig. 5B); *see also id.* at 19 (arguing "a telematic device is a multifunction device such as a computer, PDA and the like that integrates together at least the features of information, communication, computing, and entertainment technologies"), 47 (arguing "the Plain and Ordinary meaning of telematics is provided by the [S]pecification as a multifunction device that integrates

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the difference among these terms is grammatical, not substantive. Tr. 36:16–23.

together the features of information, communication, computing, and entertainment technologies"). Patent Owner further argues

> [i]t is indisputable that the multiple applications such as navigation, mobile phone interface, Internet access, radio, *etc.* and others that are provided by a telematics device to a driver from certain telematic equipment such as a radio are necessarily done through a singular integrated multimedia output device such as a multifunction screen having both audio and visual components.

Id. at 10 (citation omitted); *see also id.* at 19–20, 48 (arguing that in view of the requisite functionalities, as well as the limitations of dependent claims 12–15, a telematic device necessarily includes an audio and visual output allowing a multitude of integrated functions, such as allowing the user to browse the Internet and retrieve content, receive e-mail, and control entertainment functions).

Patent Owner charges that Petitioner "ignores the definition provided by the Inventor himself, which Petitioner's expert is obligated to consider and use, when, as here, the inventor acts as his own lexicographer (which, in this case, is the same as the Plain and Ordinary meaning)." PO Resp. 11. Patent Owner also alleges that "Petitioner simply ignores many of the portions of the [S]pecification that describe the required features for a device to qualify as *the claimed telematics device*." PO Resp. 19, 47.

In reply, Petitioner maintains that the claim term "telematic device" does not require construction. Reply 2. Petitioner nonetheless argues that, if "telematic device" is to be construed, it should be construed as "a telecommunications device such as a telephone, PDA, computer, blackberry, and the like," in accordance with the examples of telematic devices set forth in the Specification. *Id.* at 2–3 (citing Ex. 1001, 15:2–3, 16:64–66,

17:15–21). Petitioner also argues that the inventor did not act as a lexicographer to specially define the term. *Id.* at 3–4. Petitioner further argues the Specification explains that a telematic device can be multifunctional or a standalone device and provides several examples of telematic devices that are not multifunctional or capable of integrating information, communication, computing, and entertainment technologies. *Id.* at 4 (citing Ex. 1001, 7:39–41). Petitioner additionally argues Patent Owner's evidence, namely, a document titled "What is Telematics?" contradicts Patent Owner's construction because it states that telematics can consist of a single-function GPS. *Id.* at 5 (citing Ex. 2024).

In its Sur-reply, Patent Owner contends that "the definition of telematics provided in the Field of Invention [section of the '170 patent] clearly and concisely defines the functional aspects of telematics" and that "this definition is a summary of the feature set required by the telematics devices of the invention as described in other places in the [S]pecification." Sur-reply 3 (citing Ex. 1001, 1:18–24, written description associated with Figs. 3–5; Ex. 2027 ¶¶ 35, 48–52). Patent Owner also contends that Petitioner "attempts to supplant the definition of a more sophisticated coined term telematics device with that of a mere conventional telecommunications device." *Id.* at 5. Patent Owner similarly contends Petitioner's construction of "telematic device" is "plainly repugnant even to its natural and historical meaning from 1978 which is based at a minimum on *a combination of both telecommunications and informatics technologies*." *Id.* at 7 (citing Ex. 2024; Ex. 2027 ¶ 30). Patent Owner further contends: "[T]he [S]pecification does not describe 'standalone telematic devices' or 'single function telematic

devices.' Rather, it merely describes 'standalone telematics' and other devices that are enabled along with the telematic device." *Id.* at 8.

To construe the claim term "telematic device," we begin with the claims. All of the independent claims, namely claims 1, 22, 27, and 31, recite a method for controlling a device in a vehicle operated by a driver. Ex. 1001, 22:55–56, 24:18–19, 24:47–48, 25:4–5. In independent claims 1 and 31, the device is a telematic device, whereas, in independent claims 22 and 27, the device is a cell phone. *Id.* Independent claim 1 recites that the telematic device has an input and an output in two formats, and the recited steps include preventing output in the original format, providing output in the other format, and permitting the driver to access the input or providing output in the original format. *Id.* at 22:55–23:6. Independent claim 31 recites that the telematic device has two input interfaces, and the recited steps include changing the input interface from the original input interface to the alternative input interface and vice versa. *Id.* at 25:4–18. Independent claims 1 and 31 do not otherwise describe the recited telematic device.

Patent Owner contends that audio and visual outputs recited in dependent claims 12–15 confirm that a telematic device must include a multimedia output and allow for a multitude of integrated function. PO Resp. 19–20, 48. We disagree.

"By definition, an independent claim is broader than a claim that depends from it." *Littelfuse, Inc. v. Mersen USA EP Corp.*, 29 F.4th 1376, 1380 (Fed. Cir. 2022). The doctrine of claim differentiation, which is premised on the notion that different claims have different scopes, "normally means that limitations stated in different claims are not to be read into the independent claim from which they depend." *Karlin Tech., Inc. v. Surgical*

Dynamics, Inc., 177 F.3d 968, 971–72 (Fed. Cir. 1999) (citing *Transmatic, Inc. v. Gulton Indus., Inc.*, 53 F.3d 1270, 1277 (Fed. Cir. 1995)). While the telematic device recited in independent claim 1 must be broad enough to encompass audio and visual outputs, the recited telematic device does not necessarily require a multimedia output.

Turning to the Specification, Patent Owner is correct that the Specification expressly describes the field of telematics as "the field of integrating information, communication, computing, and entertainment technologies into vehicles for civilian and military use." Ex. 1001, 1:18–21. Based on this description of the field of telematics, Patent Owner construes "telematic device" as a central multifunction device that integrates together the features of information, communication, computing, and entertainment technologies. *See* Sur-reply 3 (arguing that "the definition of telematics provided in the Field of Invention clearly and concisely defines the functional aspects of telematics" and that "this definition is a summary of the feature set required by the telematics devices of the invention as described in other places in the [S]pecification"). After reviewing the Specification, however, we do not find support for Patent Owner's extrapolation of the meaning of "telematic device" from the description of the field of telematics. The Specification describes a safety control system that falls within the field of telematics by integrating devices having different technologies; it does not describe a telematic device as a central multifunction device that integrates together the features of informational, communication, computing, and entertainment technologies.

The Specification describes the disclosed invention as relating to "safety control systems for vehicles to reduce driver distraction, avoiding

potentially dangerous conditions tending to produce accidents." Ex. 1001, 1:21–24. As shown in Figure 3, the safety control system comprises microprocessor 20, which receives inputs from a plurality of sensors S_1–S_{11} and a navigation system and produces outputs that, for example, disable a telephone or other telematic device from making outgoing calls and disable a computer from accessing the Internet. *Id.* at 9:31–35, 13:3–13, Fig. 3; *see also id.* at 19:26–31 ("The system controls all machine to man communications (e.g. phone, vehicle alarms/indicators, computer, PDA, etc[.]) to and from the driver as a function of the monitored factors that provide an indication of the level of attention required by the driver to safely operate and control the vehicle."). The Specification describes that "microprocessor 20, among other functions, acts as a 'state machine' to define, arrange and prioritize features and functionalities of the system." *Id.* at 10:57–60. The Specification further describes "[t]he state machine aspect of the microprocessor may make telematic control decisions on a variety of criteria such as: (a) the frequency of use of the application, the frequency in which a number, e-mail or URL is contacted; (b) based on safety/urgency priorities . . . ." *Id.* at 10:61–11:5. Thus, according to the Specification, the safety control system, including the microprocessor, is a central multifunction device that integrates information, communication, computing, and entertainment technologies, in accordance with the Specification's description of telematics. Patent Owner even points to the safety control system as a telematic device. PO Resp. 20–22. According to Patent Owner, the Specification describes "microprocessor 20 [of the telematic device]." *Id.* at 21 (alteration in original) (quoting Ex. 1001, 10:57–11:2).

Yet, the Specification does not refer to the safety control system as a telematic device. To the contrary, the Specification refers to the devices integrated into the safety control system as telematic devices. For example, as set forth above, Figure 3 shows microprocessor 20 providing outputs 41–43 to disable various functions of a telephone and a computer. The Specification describes the telephone and computer, as well as other devices controlled by microprocessor 20, as telematic devices. *See, e.g.*, Ex. 1001, 5:49–51, 6:13–17, 16:30–35, 18:30–34.

In addition to describing that telematic devices are integrated into the safety control system via the microprocessor, the Specification provides examples of telematic devices. Ex. 1001, 5:47–28, 15:2–3, 16:65, 17:17–18; *see also id.* at Fig. 5 (showing telematics equipment connections including telephone, navigation, directory, message recorder, pager, e-mail, Internet browsing, intelligent collision alarms, long call anti distraction, PDA, and phonebook). Petitioner's construction of "telematic device" as a "telecommunications device" is based on the examples of telematic devices set forth in the Specification. Reply 2–3. The Specification, however, does not describe the examples of telematic devices as telecommunications devices or otherwise explain why the examples qualify as telematic devices.

We next look to the extrinsic evidence in the record, namely the declarants' testimonies, to ascertain whether the term "telematic device" has a particular meaning in the field. Petitioner does not point to any testimony in support of its construction of "telematic device." Patent Owner's construction is based on Mr. Peck's testimony. In addition to explaining that Patent Owner's construction is based on the description of the field of telematics in the Specification (Ex. 2027 ¶ 45), Mr. Peck testifies that "[t]he

term 'telematics' is a term of art that was coined based on a concatenation of two words - 'telecommunications' and 'informatics'" (*id.* ¶ 30 (citing Ex. 2024)).

In view of the foregoing, we find the claims provide little guidance as to the meaning of "telematic device," but the audio and visual outputs recited in dependent claims 12–15 do not require a telematic device to have a multimedia output. We further find the Specification does not refer to the safety control system that integrates various technologies as a telematic device but instead refers to the devices integrated into the safety control system as telematic devices. Ex. 1001, 5:49–51, 6:13–17, 16:30–35. Fig. 3. We also find the Specification provides examples of telematic devices, but does not describe the examples as telecommunications devices or explain why they qualify as telematic devices. Additionally, we find credible Mr. Peck's unrebutted testimony that "telematics" is a term of art and represents the combination of the words "telecommunications" and "informatics," as this testimony is supported by the document titled "What is Telematics?" (Ex. 2024).

Thus, with the Specification's description of a telematic device as a device integrated into a safety control system that incorporates various technologies and the evidence that "telematics" is a term of art, we construe the claim term "telematic device" as a telecommunications and informatics device.

2. "providing the driver a signal"

Claim 10 includes the term "providing the driver a signal." Ex. 1001, 23:44. In its Petition, Petitioner does not provide an express construction for this claim term, but argues that "blanking the screen would be a visual

indicator or *signal* detectable by the driver." Pet. 23 (citing Ex. 1003 ¶¶ 186–187).

In its Response, Patent Owner contends the claim term "providing the driver a signal" should be construed as "[p]roviding a signal that actuates (puts into action) an audio or visual indicator." PO Resp. 17. According to Patent Owner, "the [S]pecification describes 'actuating' *i.e.*, putting into action a signal not removing a signal from action." *Id.* at 26 (citing Ex. 1001, 13:11–13, 14:21–27, 14:51–54; Ex. 2025; Ex. 2027 ¶ 61).

In reply, Petitioner argues "providing the driver a signal" means "providing the driver with an audible, visual, or tactile indicator." Reply 6. In support of its construction, Petitioner relies on the Specification's description of the safety control system enabling a driver to select the type of feedback from the system, which may be "audible, visual, tactile, etc." *Id.* (citing Ex. 1001, 20:61–66). Petitioner also argues that, contrary to Patent Owner's proposed construction, the '170 patent does not require the audible or visual signal to be actuated. *Id.*

Patent Owner responds that Petitioner "ignor[es] multiple instances in the [S]pecification that describe 'providing' as affirmatively 'supplying a signal' using the terms 'actuating' . . . or 'activating.'" Sur-reply 8–9 (citing Ex. 1001, 13:10–13, 13:36–37, 14:21–27, 14:39–41, 14:51–54; Ex. 2025; Ex. 2027 ¶ 61). Patent Owner further responds that providing a signal is the opposite of suppressing a signal and that the Specification's description of customizing the system's feedback does not support a signal being a suppressed signal. *Id.* at 9.

We agree with Petitioner that intrinsic evidence does not support Patent Owner's proposed construction, which requires a signal that actuates

an audio or visual indicator. In support of its construction, Patent Owner points to the Specification's description of control signals. As set forth in the Specification, the outputs from microprocessor 20 include control signals which are effective to disable the telephone from making outgoing calls or receiving incoming calls, disable the computer from accessing the Internet, actuate a visual indicator, or actuate an audible alarm. Ex. 1001, 13:3–13, 13:36–38, 14:21–27, 14:36–41, 14:51–54, Figs. 3–4. To disable and actuate the audio and visual indicators, the control signals are provided from the microprocessor to the devices integrated therewith, namely the telephone, computer, visual indicator, and alarm. Patent Owner relies on the Specification's description of electrical signals between devices, whereas the claim term recites providing the driver a signal. Thus, the Specification's description of the control signals does not relate to the claim term.

We also agree with Petitioner that the claim term "providing the driver a signal" should be construed as providing the driver with an audible, visual, or tactile indicator. Both parties' proposed constructions require providing an audible or visual indicator. Petitioner's construction additionally contemplates a tactile indicator. As Petitioner correctly argues, the Specification expressly describes providing audible, visual, and tactile indicators to a driver. Reply 6 (citing Ex. 1001, 20:61–66).

In view of the intrinsic evidence, we adopt Petitioner's construction of "providing the driver a signal" as providing the driver with an audible, visual, or tactile indicator.

3. "downloading"

Claim 20 includes the term "downloading." Ex. 1001, 24:14. In its Petition, Petitioner does not provide an express construction for this claim

term but argues "[a]n ordinary artisan would have understood the transmitted data is received and *downloaded* by [Arnold's travel guide] system 200." Pet. 34 (citing Ex. 1003 ¶¶ 213–215).

In its Response, Patent Owner contends the claim term "downloading" should be construed as "[r]eceiving computer-based information based on a request." PO Resp. 17; *see also id.* at 33 (citing Ex. 2023) (arguing "a 'download' is defined as 'receiving computer-based information based on a request"). According to Patent Owner, "a download, such as an *http* transfer (hypertext transfer protocol), as would be understood by an ordinary artisan, requires the client to request from the server the information to be downloaded" and "[t]his is because the client needs to establish a reliable communication channel with the server for information transfer and reserve client resources such memory space and initialize a communication pathway for successfully receiving the requested information." *Id.* at 33 (citing Ex. 2023; Ex. 2027 ¶ 70).

In its Reply, Petitioner argues the claim term "downloading" should be construed as "transmitting from a central computer to a remote computer." Reply 8–9. Petitioner's proposed construction is based on the definition of "downloading" in three technical dictionaries. *Id.* at 8 (citing Ex. 1042, 647; Ex. 1043, 140; Ex. 1044, 3).[12] According to Petitioner, the intrinsic evidence is ambiguous as to the meaning of the claim term "downloading" such that extrinsic evidence, including dictionaries and learned treatises, may be used to assist in construction of the term. *Id.* at 7.

[12] The citations to Exhibits 1042–1044 refer to the original page numbering of the reference itself, not the page numbering Petitioner added for the exhibit.

Petitioner also argues Patent Owner's proposed construction is unduly narrow because it is based on a specific data transfer protocol, namely http, which is commonly understood as the communication protocol for transmitting documents between computers and the basis for the World Wide Web. *Id.* at 8 (citing Ex. 1042, 1037), 9.

In its Sur-reply, Patent Owner responds that Petitioner incorrectly alleges the Specification provides no guidance as to the meaning of "downloading" and that the Specification specially describes the type of data transfer protocols used by the state machine as those governed by http, file transfer protocol (FTP), e-mail, or other similar data transfer protocols, all of which require a request before the transfer of data. Sur-reply 11 (citing Ex. 1001, 16:64–17:4; Ex. 2027 ¶¶ 70–71). Patent Owner further responds that claim 20 itself provides guidance as to the meaning of "downloading" because it recites the step of downloading data, software, operating systems, and applications, which require a reliable download protocol such as a protocol with a request. *Id.* at 12.

To construe the claim term "downloading," we begin with the claims. Claim 20 recites downloading data, software, operating systems, and applications, but is silent regarding a data transfer protocol, much less a data transfer protocol requiring a request. Ex. 1001, 24:13–15. To the extent Patent Owner is arguing that a person of ordinary skill in the art would have understood that downloading data, software, operating systems, and applications requires a data transfer protocol having a request, we find no support in the record for such an argument.

Turning to the Specification, the Specification does not use the term "downloading" and includes only one instance of a related form of the term. According to the Specification:

> The state machine can allow driver to set their preferences on a portable telematics device such as a cellular phone, or a WAN, Web site or via a FTP and e-mail. Such set up can be transferred to the vehicle in use when the driver docks the cell phone or other portable telematics devices to the system gateway. The *downloaded* profile will be updated with driving skills, driver habits and geographical/time/date based notes added by the driver while driving.

Ex. 1001, 16:64–17:4 (emphasis added). Although the Specification provides examples of setting up a driver's preferences with various means that may utilize a data transfer protocol with a request, the Specification nonetheless describes downloading simply as transferring the driver's preferences from the telematics device to the vehicle's state machine. *Id.*

We next consider to the extrinsic evidence in the record to determine whether "downloading" has a particular meaning in the field. Petitioner's construction is based on three different technical dictionaries, all of which define "download" essentially as to transmit data[13] from a central computer to a remote computer. Reply 8 (citing Ex. 1042, 647; Ex. 1043, 140; Ex. 1044, 3). Patent Owner's construction is based on an online explanation of http. PO Resp. 33 (citing Ex. 2023). As Patent Owner's online explanation does not contemplate the meaning of "downloading," we do not find it probative.

[13] Petitioner explains that, unlike the technical definitions, its proposed construction does not recite what is downloaded, e.g., data, because claim 20 specifically recites what is downloaded. Reply 9 n.9.

In view of the foregoing, we find the claims provide little guidance as to the meaning of "downloading." We also find the Specification describes the process for downloading a driver's profile as transferring the driver's preferences from a telematics device to the vehicle's state machine and provides exemplary means for setting up a driver's preferences that result in a downloaded profile. Furthermore, we find the three technical dictionary definitions of "download" credible evidence that the term is known in the art to mean to transmit data from a central computer to a remote computer.

Thus, with the Specification's description of transferring the driver's preferences from the telematics device to the vehicle's state machine to create a downloaded profile and the evidence that those skilled in the art understand "download" means to transmit data from a central computer to a remote computer, we adopt Petitioner's construction of "downloading" as transmitting from a central computer to a remote computer.

D. OBVIOUSNESS BASED ON ARNOLD—CLAIMS 1, 2, 6, 10, 12–15, AND 20

Petitioner challenges claims 1, 2, 6, 10, 12–15, and 20 under 35 U.S.C. § 103(a), contending the claimed subject matter would have been obvious in view of Arnold and the knowledge of an ordinary artisan. Pet. 5–34; Reply 9–19. Patent Owner argues the claims are patentable over Arnold and the knowledge of an ordinary artisan. PO Resp. 18–35; Sur-reply 13–19.

We begin our analysis of this asserted ground of unpatentability with an overview of Arnold. We then turn to the parties' contentions for each of the claims.

1. Arnold

Arnold is the October 1, 1998, publication of International Application No. PCT/US98/05737, filed on March 23, 1998. Ex. 1036, codes (21), (22), (43). There is no dispute that Arnold is prior art. *See generally* PO Resp.

Arnold is titled "In-vehicle Screen Blanking Using Global Positioning System (GPS) Speed Data." Ex. 1036, code (54). Arnold "relates generally to in-vehicle travel information display systems, and more particularly to a method and apparatus for blanking in-vehicle display screens when the vehicle speed exceeds a predetermined speed, where the vehicle speed is determined from position indicated signals provided by a Global Positioning Systems (GPS)." *Id.* at 1.[14]

Arnold's in-vehicle screen blanking system is shown in Figure 1, reproduced below.

[14] Arnold does not include paragraph or line numbering, and our citations to Exhibit 1036 refer to page numbers.

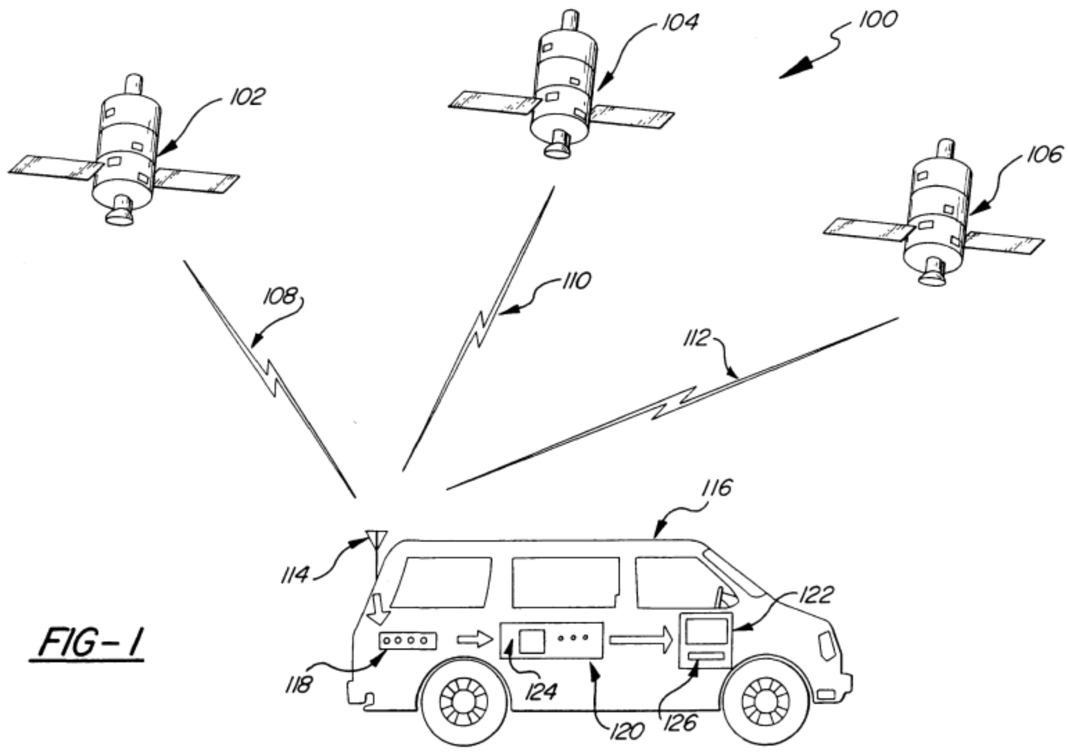

FIG-1

Figure 1 is a diagram of an in-vehicle screen blanking system 100. Ex. 1036, 3. As shown in Figure 1, GPS satellites 102, 104, 106 send positioning signals 108, 110, 112, respectively. *Id.* at 4. GPS signal receiving antenna 114 in vehicle 116 receives the positioning signals and sends them to GPS receiver 118. *Id.* GPS receiver 118 is coupled to data processor 120, which includes speech synthesizer 124. *Id.* Data processor 120 is coupled to in-vehicle display screen 122, which includes speaker 126. *Id.* Display screen 122 may be part of a travel guide information system that displays typical road signs, such as approaching intersection signs, "Road Construction Ahead" signs, signs for rest stops, and signs for commercial advertisements. *Id.*

Figure 7, reproduced below, depicts the operation of the in-vehicle screen blanking system.

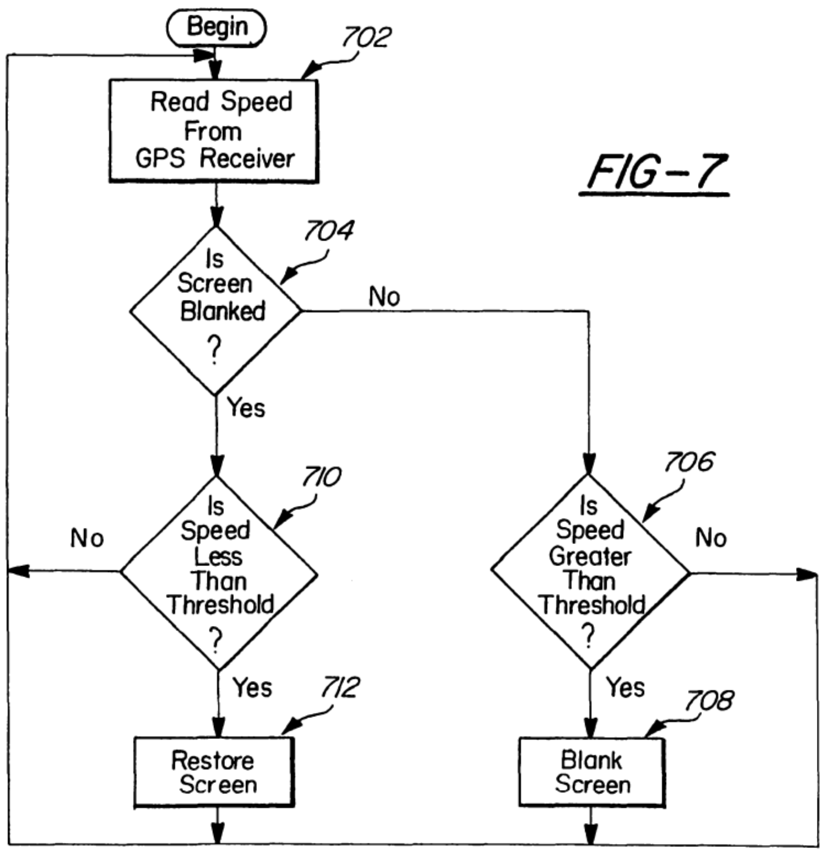

Figure 7 is a flowchart illustrating the steps of operation of the in-vehicle blanking system. Ex. 1036, 3. GPS receiver 118 determines the speed of vehicle 116 based on received GPS positioning signals. *Id.* at 7–8. In step 702, data processor 120 reads the vehicle speed from GPS receiver 118 and, in step 704, determines whether display screen 122 is blanked. *Id.* at 8. If not, and if the vehicle's speed is greater than a predetermined threshold as determined in step 706, the display screen is blanked in step 708. *Id.* In this case, speech synthesizer 124 and speaker 126 can present data in audio format. *Id.* If, in step 704, the display screen is determined to be blanked, it is assumed that the vehicle's speed previously exceed the predetermined

threshold. *Id.* It is then determined, in step 710, whether the vehicle's speed is less than the predetermined threshold. *Id.* If not, the display screen is kept off. *Id.* In this case, the data processor returns to step 702 and rechecks the vehicle's speed. *Id.* at 8–9.

2. Independent Claim 1

Petitioner maps each element of independent claim 1 to Arnold's disclosure. Pet. 6–19 (citing Ex. 1001, 17:14–20, claim 14; Ex. 1003 ¶¶ 96–98, 129–131, 133–143, 145–148, 150–154, 156–158, 160–162, 164–166; Ex. 1036, 1–2, 4–5, 8–9, claims 1, 2, 10, 11, Figs. 2, 7). Petitioner relies on Arnold's in-vehicle blanking system for disclosing the recited method for controlling a telematic device, and, in particular, Petitioner relies on Arnold's travel guide system for disclosing the recited telematic device. *Id.* According to Petitioner, Arnold's in-vehicle blanking system discloses the recited method for controlling a telematic device because Arnold's in-vehicle blanking system, which includes a travel guide system having a display screen for displaying road signs, blanks the display screen in favor of providing data in an audio format when a vehicle's speed is above a predetermined threshold. *Id.*

Patent Owner's only argument against Petitioner's contentions for independent claim 1 is that Petitioner has not shown Arnold's travel guide system discloses the recited telematic device.[15] PO Resp. 18–25. Patent

[15] Patent Owner specifically references claim elements 1.0 and 1.4 in arguing that Petitioner has failed to show that Arnold's travel guide system discloses the recited telematic device, but acknowledges that all of the claim elements include the term "telematic device." PO Resp. 23 (arguing "[t]here simply is no description teaching or suggestion of any type of multifunction

Owner's argument is premised on its proposed construction of the claim term "telematic device" as a multifunction device integrating together at least the features of information, communication, computing, and entertainment technologies, which necessarily includes an audio and visual output. *Id.* Applying its construction of "telematic device," Patent Owner argues that Arnold's travel guide system is not a telematic device because it is a standalone, unintegrated, single-function device. *Id.* at 22–23 (citing Pet. 7; Ex. 1036, 3–9, Figs. 2–4; Ex. 2027 ¶¶ 53–54; Ex. 2029). Patent Owner further argues that, even if Arnold's travel guide system is a navigation system that integrates information, communication, and computing technologies, it does not integrate entertainment technologies. *Id.* at 23–24 (citing Inst. Dec. 11; Ex. 2027 ¶ 55; Ex. 2028). Patent Owner also argues that Petitioner provides insufficient explanation as to why Arnold's travel guide system discloses the recited telematic device and applies the wrong meaning of the claim term. *Id.* at 24 (citing Pet. 7; Ex. 1003 ¶¶ 129–131; Ex. 2027 ¶ 56).

In its Reply, Petitioner disagrees with Patent Owner's construction of "telematic device." Reply 9–12. In particular, Petitioner argues the recited telematic device encompasses a standalone device and is not limited to a multifunction device that integrates various technologies. *Id.* at 10 (citing Ex. 1001, 7:40–41), 12 (citing Ex. 1001, 16:52–63). Petitioner also argues a standalone navigation system, like Arnold's travel guide system, discloses the recited telematic device because the '170 patent continually reiterates that a telematic device may be a navigation system or a GPS system. *Id.*

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integrated telematics device at all as required by element 1.0 (and elements 1.1-1.5) of claim 1"); Ex. 1001, 22:55–23:6.

at 12–13 (citing Ex. 1001, 5:44–48, 13:23–25, 18:29–34). Petitioner similarly contends that, according to Mr. Peck, the term "telematics" was developed with the introduction of GPS systems, and that Arnold is directed to a navigation system using a GPS system. *Id.* at 13–14 (citing Ex. 1036, Fig. 2; Ex. 2027 ¶ 30).

In its Sur-reply, Patent Owner maintains Arnold does not disclose the recited telematic device pursuant to its proffered construction of the claim term. Sur-reply 13–16. Specifically, Patent Owner argues Arnold's standalone travel guide system is not a telematic device. *Id.*

As set forth above in section III.C.1, we do not adopt Patent Owner's proposed construction of "telematic device." Rather, we construe "telematic device" as a telecommunications and informatics device. Under our construction, we are persuaded Arnold's travel guide system discloses the recited telematic device.

As an initial matter, we agree with Petitioner that the '170 patent describes a navigation system, such as Arnold's travel guide system, is a telematic device. Reply 12–13 (citing Ex. 1001, 5:44–48, 13:23–25, 18:29–34). Furthermore, both Mr. Andrews and Mr. Peck testify that GPS systems were known to be telematic devices. Ex. 1003 ¶ 62; Ex. 2027 ¶ 30 (citing Ex. 2024).

Furthermore, Petitioner has shown that Arnold's travel guide system is a telecommunications and informatics device. Petitioner correctly argues that Arnold discloses travel guide system 200 including message receiving antenna 202, message receiver 204, GPS antenna 205, location determining system 206, processor 208, and in-vehicle display 210. Pet. 6 (citing Ex. 1036, 4–5, Fig. 2). Message receiving antenna 202 and GPS

antenna 205 are operatively coupled to message receiver 204 and location determining system 206, respectively, and message receiver 204 and location determining system 206 are operatively coupled to processor 208, which is operatively coupled to in-vehicle display 210. Ex. 1036, 4–5, Fig. 2. Location determining system 206 determines the actual location and direction of the vehicle from the GPS position indicating signals sent by GPS satellites 102, 104, 106. *Id.* at 4, 6. Message receiver 204 receives and stores messages from message sending antenna 308 in transmitted message format 400 comprising multiple fields, such as vehicle location and direction field 404 and sign data field 406. *Id.* at 5–6, Figs. 2–4. Processor 208 compares location and direction field 404 of a message with the actual location and direction of a vehicle determined by location determining system 206 from the GPS position indicating signals. *Id.* at 6. If they are substantially similar, processor 208 sends the sign data from sign data field 406 of the message to be displayed on in-vehicle display screen 210. *Id.* As Arnold's travel guide system 200 receives message and GPS data and uses this data to display road signs on a display, we are persuaded Arnold's travel guide system is a telecommunications and informatics device and thus discloses the recited telematic device.

After considering the parties' arguments and evidence, Petitioner has persuaded us that Arnold discloses every element of independent claim 1. Specifically, we are persuaded that Arnold's in-vehicle blanking system, which includes a travel guide system and blanks the display screen of the travel guide system in favor of providing data in an audio format when a vehicle's speed is above a predetermined threshold, discloses the recited method for controlling a telematic device. Petitioner has shown, by a

preponderance of the evidence, that the subject matter of independent claim 1 would have been obvious over Arnold.

3. Claims 2 and 6

Claim 2 depends from independent claim 1 and recites that the method further includes the step of

> preventing an attempted input or output in response to a sensed parameter of said at least one condition being outside of a threshold and operable to permit access to a said input or communication of a said output from the telematic device after said sensed condition that caused prevention of the attempted input or output is again sensed to be within the threshold.

Ex. 1001, 23:7–14. For the step recited in claim 2, Petitioner argues that Arnold's in-vehicle blanking system blanks the display screen when a vehicle speed is greater than a predetermined threshold. Pet. 19–20 (citing Ex. 1003 ¶¶ 168–169; Ex. 1036, 8, claim 1, Fig. 7). Petitioner further argues that Arnold's in-vehicle blanking system's logic reevaluates and restores the screen when the vehicle speed is below the threshold. *Id.* at 20 (citing Ex. 1003 ¶¶ 170–172; Ex. 1036, 8, claim 2, Fig. 7). Additionally, Petitioner argues Arnold discloses preventing an attempted input via a keyboard when a vehicle speed is above a threshold and reenabling the keyboard when the vehicle is not moving. *Id.* at 21 (citing Ex. 1003 ¶¶ 173–175).

Claim 6 depends from independent claim 1 and recites that the method further comprises the step of "denying the driver access to the input screen when the movement of the telematics device is above a threshold." Ex. 1001, 23:27–29. For this step recited in claim 6, Petitioner argues Arnold discloses that a driver can use a keyboard to input a threshold speed, which would be visible on the display screen. Pet. 21–22 (citing Ex. 1036, 8). Petitioner further argues Arnold discloses that a driver is denied access

to the input by blanking the display screen. *Id.* at 22 (citing Ex. 1003 ¶¶ 178–183; Ex. 1036, claim 1).

Patent Owner does not present arguments for claims 2 and 6 apart from its arguments for independent claim 1. *See, e.g.*, PO Resp. 25 (arguing "[d]ependent claims 2, 6, 10, 12-15 are therefore patentable for at least the same reasons [as independent claim 1], and no further discussion of additional reasons for patentability is deemed necessary at this time"). We address Patent Owner's arguments for independent claim 1 above in section III.D.2.

After considering the parties' arguments and evidence, Petitioner has persuaded us that Arnold's in-vehicle blanking system discloses the steps recited in claims 2 and 6. Petitioner has shown, by a preponderance of the evidence, that the subject matter of claims 2 and 6 would have been obvious over Arnold.

4. Claim 10

Claim 10 depends from independent claim 1 and recites that the method further includes the step of "providing the driver a signal that a the [sic] movement of the telematics device is at or above of [sic] a threshold." Ex. 1001, 23:43–45. For the step recited in claim 10, Petitioner relies on Arnold's in-vehicle blanking system blanking the display screen when a vehicle speed is above a predetermined speed. Pet. 23 (citing Ex. 1036, 8). According to Petitioner, "[a]n ordinary artisan would have understood that blanking the screen would be a visual indicator or *signal* detectable by the driver indicating the movement of the device is above the predefined speed limit. *Id.* (citing Ex. 1003 ¶¶ 186–187).

Patent Owner contends Petitioner incorrectly argues that the absence of a visual output or signal qualifies as a signal. PO Resp. 26 (citing Ex. 2027 ¶ 60). Per Patent Owner, suppressing a signal is the opposite of providing a signal. *Id.* Patent Owner further contends "the [S]pecification describes 'actuating' *i.e.*, putting into action a signal not removing a signal from action. *Id.* (citing Ex. 1001, 13:11–13, 14:21–27, 14:51–54; Ex. 2025; Ex. 2027 ¶ 61). Patent Owner also contends that Mr. Andrews incorrectly concludes that blanking the screen is a visual indicator to a driver of the movement of the telematic device being above a predefined speed because, according to Patent Owner, a driver would have no way of knowing whether the screen was blanked due to the movement exceeding a threshold speed or simply malfunctioning. *Id.* at 27 (citing Ex. 2027 ¶ 63).

Petitioner replies that "[Patent Owner] attempts to interject the phrase 'actuate' into the claim" and that "the claim just requires a 'signal' be provided." Reply 14–15. Petitioner additionally replies that the '170 patent describes customizing the signal indicating the movement of the telematic device is at or above a threshold and that a driver could customize the signal to be blanking the screen. *Id.* at 14 (citing Ex. 1001, 20:60–66).

Patent Owner responds that Petitioner "glosses over the term 'providing' in a manner that seeks to read it out of the claim by arguing that the absence of a signal in blanking the screen is the same as 'providing' a signal." Sur-reply 16. Patent Owner further responds that, even if the '170 patent describes customizing the signal, there is still no description of completely removing a signal as a signal. *Id.* at 17.

Patent Owner's argument that blanking a screen is suppressing a signal and thus the opposite of providing a signal is premised on its

proposed construction of the claim term "providing a signal to the driver" as providing a signal that actuates an audio or visual indicator. As set forth above in section III.C.2, we do not adopt Patent Owner's proposed construction. Rather, we construe "providing the driver a signal" as providing the driver with an audible, visual, or tactile indicator, which does not exclude providing a blanked screen.

The parties dispute whether a blanked screen is an indicator that movement of the telematics device is at or above a threshold. Based on Mr. Andrews's testimony, Petitioner argues that a driver would understand blanking the screen is a signal that the movement of the telematics device was above a threshold speed. Pet. 23 (citing Ex. 1003 ¶¶ 186–187). Patent Owner cites Mr. Peck's testimony that a driver would have no way of knowing whether the screen was blanked due to the movement exceeding a threshold speed or some other reason such as a malfunction. PO Resp. 27 (citing Ex. 2027 ¶ 63). Mr. Andrews bases his testimony on Arnold's disclosure that federal and other regulations require a screen to be blanked to prohibit distractions for drivers of commercial vehicles, whereas Mr. Peck does not provide support for his testimony. Ex. 1003 ¶ 187 (citing Ex. 1036, 1); Ex. 2027 ¶ 63. Given its support, we find Mr. Andrews's testimony more credible, and we are persuaded that providing a blanked screen is providing a visual indicator that movement of the telematics device is at or above a threshold.

After considering the parties' arguments and evidence, Petitioner has persuaded us that Arnold's in-vehicle blanking system, which blanks the display screen when a vehicle speed is above a predetermined speed, discloses providing the driver a signal that movement of the telematics

device is at or above a threshold, as recited in claim 10. Petitioner has shown, by a preponderance of the evidence, that the subject matter of claim 10 would have been obvious over Arnold.

5. Claims 12–14

Claim 12 depends from independent claim 1 and recites that the method further comprises the step of "having visually accessible information changed to verbal announcements." For the step recited in claim 12, Petitioner argues Arnold's in-vehicle blanking system blanks the display screen and converts the message to be displayed to an audio format when a vehicle speed is greater than a predetermined threshold. Pet. 24–25 (citing Ex. 1003 ¶¶ 190–191; Ex. 1036, 8).

Claim 13 depends from independent claim 1 and recites that the method further comprises the step of "having an incoming text based message read." Ex. 1001, 23:53–54. For recited step of claim 13, Petitioner argues Arnold's in-vehicle blanking system displays intersection signs or other traffic/travel information and blanks the display screen and converts the message to be displayed to an audio format when a vehicle speed is greater than a predetermined threshold. Pet. 25–26 (citing Ex. 1003 ¶ 194; Ex. 1036, 4, 8, claim 10). Petitioner further argues Arnold discloses that the sign information displayed on the display screen is first received as a message. *Id.* at 26–28 (citing Ex. 1036, 5, Figs. 2–4). According to Petitioner, an ordinary artisan would have understood the message received by the system includes data that would be displayed visually and text, such as "Rest Stop Ahead" and "Accident Ahead," that would be presented in an audio format. *Id.* at 28–29 (citing Ex. 1003 ¶¶ 194–201).

Claim 14 depends from independent claim 1 and recites that the step of providing said at least one output to the driver in a different format comprises "selecting at least one from the group consisting of changing the volume, changing the sound effect, changing the tactile feedback, muting the telematic device, converting text to speech, blocking video output but permitting audio output, and replacing video output with a different display." Ex. 1001, 23:55–61. For claim 14, Petitioner relies on Arnold's in-vehicle blanking system blanking the display screen and presenting the message to be displayed in an audio format. Pet. 29 (citing Ex. 1003 ¶¶ 203–204; Ex. 1036, 8, claim 10).

Patent Owner does not present arguments for claims 12–14 apart from its arguments for independent claim 1. *See, e.g.*, PO Resp. 25 (arguing "[d]ependent claims 2, 6, 10, 12-15 are therefore patentable for at least the same reasons [as independent claim 1], and no further discussion of additional reasons for patentability is deemed necessary at this time"). We address Patent Owner's arguments for independent claim 1 above in section III.D.2.

After considering the parties' arguments and evidence, Petitioner has persuaded us that Arnold's in-vehicle blanking system discloses the steps recited in claims 12–14. Petitioner has shown, by a preponderance of the evidence, that the subject matter of claims 12–14 would have been obvious over Arnold.

6. Claim 15

Claim 15 depends from independent claim 1 and recites that "the step of providing said at least one output to the driver in a different format comprises converting text display to graphical display or iconic

presentation." Ex. 1001, 23:62–65. For claim 15, Petitioner argues Arnold's in-vehicle blanking system displays intersection signs or other traffic/travel information so that the displayed information includes traffic/information signs, such as "Road Construction Ahead" and "Rest Stop," navigational information, and commercial advertisements. Pet. 29–30 (citing Ex. 1003 ¶ 206; Ex. 1036, 4). Petitioner also argues an ordinary artisan would have understood the displayed information can be graphical/iconic representations, with or without textual information, that typically follows specific coloring and shape standards. *Id.* at 30 (citing Ex. 1003 ¶¶ 96–98, 207). Petitioner further argues that an ordinary artisan would have understood a sign including both iconic and textual information requires greater cognitive load than graphical information and that an ordinary artisan would have modified Arnold's in-vehicle blanking system to suppress the textual component of a displayed road sign to reduce the level of distraction to the driver. *Id.* (citing Ex. 1003 ¶ 208).

Patent Owner maintains Petitioner has not shown that Arnold renders the subject matter of claim 15 obvious. PO Resp. 28–32. Patent Owner argues:

> Nowhere in *Arnold* is there any teaching or suggestion whatsoever of how or why it would be desirable to discriminate textual message content from a graphic or iconic content and then selectively filter out the textual portions of the message and then recompose it in a way that results in graphical traffic management content that would still make sense to the driver.

PO Resp. 28. Per Patent Owner, most drivers would not recognize a yield sign without the text "YIELD" in the middle. *Id.* at 28–29 (citing Ex. 2027 ¶ 65). Patent Owner also argues "the system of *Arnold* would need highly complex and sophisticated computational engine and specialized software to

analyze content and to determine how to strip and/or suppress certain content portions and retain others and still maintain driver comprehension in a way that somehow reduces the 'cognitive load' on the driver." *Id.* at 29 (citing Ex. 2027 ¶ 66). Patent Owner further argues that "[t]he general goal of reducing cognitive load simply does not provide the requisite technical teaching or motivation to modify *Arnold* in the specific way proposed by [Petitioner]" and that "cognitive load would at least in some instances be increased." *Id.* at 30 (citing Ex. 2027 ¶¶ 67–68). Patent Owner additionally argues Arnold fails to disclose a second display format and instead teaches only blanking out screen outputs and providing those outputs in audio format. *Id.* at 28 (citing Ex. 1003 ¶ 162; Ex. 1036, 8), 30. According to Patent Owner, "because [Petitioner] fails to show all the elements of the claim in one or more references, it fails to describe how one of ordinary skill would modify the prior art to produce the claimed invention and clearly relies on hindsight reconstruction in an attempt to produce the claimed invention." *Id.* at 32.

In reply, Petitioner argues the Manual on Uniform Traffic Control Devices ("MUTCD") includes advanced warning traffic signs that are graphical representations without wording. Reply 15–16 (citing Ex. 1035, 2C-19; Ex. 1046 ¶¶ 24–25. Petitioner also argues a skilled artisan would have understood that word messages may be used as alternates to the advanced warning traffic signs. *Id.* at 16–17 (citing Ex. 1035, 2C-22; Ex. 1046 ¶¶ 26–27). Petitioner further argues "[a] skilled artisan would have also understood that while Arnold teaches blanking a screen, it would have been obvious to modify the alternate screen to display an iconic road sign without and instead of the associated word message." *Id.* at 17 (citing

Ex. 1046 ¶¶ 26–27). According to Petitioner, a skilled artisan would have understood that displaying a sign and providing an audio message may be necessary in certain geographical locations where the road is hazardous, has increased accidents, or is subject to pedestrians or emergency vehicles crossing it. *Id.* (citing Ex. 1046 ¶ 29). Petitioner additionally argues that advanced warning traffic signs, which lack text, were known and used to provide additional emphasis for an upcoming stop, yield, or traffic signal and that modifying Arnold's in-vehicle blanking system to display an iconic road sign and provide an audio message would have been nothing more than the use of a known technique and simple substitution of known element disclosed in Arnold for another that would obtain predictable results. *Id.* at 17–18 (citing Ex. 1035, 2C-22; Ex. 1046 ¶¶ 29–31).

In response, Patent Owner contends Petitioner, in its Reply, seeks to shoehorn the MUTCD into its obviousness analysis under the guise of knowledge of the ordinary artisan. Sur-reply 17. Patent Owner also contends that the primary objective of Arnold's in-vehicle blanking system is to blank the screen at certain speeds to comply with federal and other regulations and that modifying Arnold's disclosure as Petitioner proposes is flatly inconsistent with this objective. *Id.* at 18 (citing Ex. 1036, 1–2).

We agree with Patent Owner that Petitioner improperly introduces a new theory of obviousness in its Reply by relying on the MUTCD to provide a teaching of advanced warning traffic signs that are used to provide additional emphasis for an upcoming stop, yield, or traffic signal. According to our rules, a reply may only respond to arguments raised in the corresponding patent owner response. 37 C.F.R. § 42.23(b). In our

Consolidated Trial Practice Guide,[16] we explain that a "[p]etitioner may not submit new evidence or argument in [a] reply that it could have presented earlier, e.g.[,] to make out a prima facie case of unpatentability." CTPG 73 (citing *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1077–78 (Fed. Cir. 2015)). Our Consolidated Trial Practice Guide further explains that "'[r]espond,' in the context of 37 C.F.R. § 42.23(b), does not mean proceed in a new direction with a new approach as compared to the positions taken in a prior filing," and that "[w]hile replies and sur-replies can help crystalize issues for decision, a reply or sur-reply that raises a new issue or belatedly presents evidence may not be considered." *Id.* at 74. "In most cases, the Board is capable of identifying new issues or belatedly presented evidence when weighing the evidence at the close of trial, and disregarding any new issues or belatedly presented evidence that exceeds the proper scope of reply or sur-reply." *Id.* at 80. The Board has regularly shown this capability. *See Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369–70 (Fed. Cir. 2016) (the Board refusing to consider reply brief arguments advocating a "new theory" of unpatentability in accordance with 37 C.F.R. § 42.23(b)).

In its Petition, Petitioner proposes to modify Arnold's in-vehicle blanking system to suppress the textual component of a displayed road sign to reduce the level of distraction to the driver (Pet. 30 (citing Ex. 1003 ¶ 208)), whereas, in its Reply, Petitioner, for the first time, argues the MUTCD teaches advanced warning traffic signs, which lack text, and

[16] Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019), available at https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf ("CTPG").

proposes to modify Arnold's in-vehicle blanking system to display an iconic road sign and provide an audio message (Reply 17–18 (citing Ex. 1046 ¶¶ 26–27, 29)). The arguments in Petitioner's Reply impermissibly present a new theory of obviousness, which we will not consider.

Considering Petitioner's original obviousness arguments, we are not persuaded that the subject matter of claim 15 would have been obvious over Arnold. As Patent Owner correctly avers, Arnold simply discloses blanking a visual display showing road signs in favor of providing an audio output; Arnold does not disclose different types of visual display formats, such as a text display and an iconic presentation, much less converting one type of visual display format to another. PO Resp. 28 (citing Ex. 1003 ¶ 162; Ex. 1036, 8), 30. Even if we agree with Petitioner that an ordinary artisan would have understood that road signs include both iconic and textual information, Petitioner still fails to demonstrate that it was known to suppress the textual component of a displayed road sign or otherwise convert a display of the road sign with both iconic and textual information to a display of the road sign with only iconic information. Pet. 30 (citing Ex. 1003 ¶ 208).

As Petitioner has not shown the recited step of claim 15 was known, we are not persuaded the claimed subject matter would have been obvious. Petitioner has not shown, by a preponderance of the evidence, that the subject matter of claim 15 would have been obvious over Arnold.

7. Claim 20

Claim 20 depends from independent claim 1 and recites that the method further comprises the step of "downloading data, software, operating system or add new application." Ex. 1001, 24:13–15. For the recited step of

claim 20, Petitioner argues Arnold discloses transmitting messages from remote system 300 to message receiving antenna 202 of travel guide system 200 located within a vehicle. Pet. 30–34 (citing Ex. 1003 ¶¶ 211–212; Ex. 1036, 4–5, Figs. 2–4). According to Petitioner, "[a]n ordinary artisan would have understood the transmitted data is received and *downloaded* by system 200." *Id.* at 34 (citing Ex. 1003 ¶¶ 213–215).

Patent Owner contends Arnold does not disclose downloading as recited in claim 20. PO Resp. 32–35. Patent Owner's argument is premised on its proposed construction of the claim term "downloading" as receiving computer-based information based on a request. *Id.* Applying its construction of "downloading," Patent Owner argues Arnold's system 300 continually transmits the same simple message regardless of devices are listening and has no way of receiving information requests associated with the initiation of a download operation. PO Resp. 33 (citing Ex. 2027 ¶ 71). Per Patent Owner, "[t]he system in Arnold is known as a basic pre-Internet 'broadcast' type system which constantly 'broadcasts out' messages over a radio frequency" and "[o]rdinary artisans would not consider information provided by such a broadcast-type transmission systems to be a 'download.'" *Id.* at 33–34 (citing Ex. 2027 ¶ 71). Patent Owner also argues allowing for the display a message stored in memory does not disclose downloading at least because there is no associated request. *Id.* at 34 (citing Ex. 2027 ¶ 71).

Petitioner replies that Arnold discloses the recited downloading even under Patent Owner's proposed construction. Reply 18–19 (citing Ex. 1046 ¶¶ 35–38). According to Petitioner, absent a request, system 300 would not know what sign data to send to travel guide system 200 and would need to

unnecessarily transfer large amounts of data non-stop, and a skilled artisan would not have understood system 300 to operate in this manner. *Id.* at 18–19 (citing Ex. 1046 ¶¶ 37–38).

Patent Owner responds that, contrary to Petitioner's argument, a person of ordinary skill in the art would not have understood that travel guide system 200 transmits a request. Sur-reply 12. In particular, Patent Owner argues that travel guide system 200 has no transmitter to send a request and that system 300 has no receiver for receiving a request. *Id.*

As set forth above in section III.C.3, we do not adopt Patent Owner's proposed construction of "downloading" as receiving computer-based information based on a request. Rather, we construe "downloading" as transmitting from a central computer to a remote computer. Under our construction, we are persuaded Arnold's discloses the recited downloading. As Petitioner correctly argues, Arnold discloses transmitting messages from remote system 300 to travel guide system 200 located within a vehicle. Pet. 30–34 (citing Ex. 1003 ¶¶ 211–212; Ex. 1036, 4–5, Figs. 2–4).

After considering the parties' arguments and evidence, Petitioner has persuaded us that Arnold discloses the recited step of claim 20. Petitioner has shown, by a preponderance of the evidence, that the subject matter of claim 20 would have been obvious over Arnold.

E. OBVIOUSNESS BASED ON HARDOUIN—CLAIMS 1–4, 10, 14, 16, 17, 19–21, AND 31

Petitioner challenges claims 1–4, 10, 14, 16, 17, 19–21, and 31 under 35 U.S.C. § 103(a), contending the claimed subject matter would have been obvious in view of Hardouin and the knowledge of an ordinary artisan. Pet. 34–74; Reply 19–25. Patent Owner argues the claims are patentable

over Hardouin and the knowledge of an ordinary artisan. PO Resp. 35–58; Sur-reply 19–24.

We begin our analysis of this asserted ground of unpatentability with an overview of Hardouin. We then turn to the parties' contentions for each of the claims.

1. Hardouin

Hardouin issued as U.S. Patent No. 6,311,078 B1 on October 30, 2001, from U.S. Application No. 09/196,542, which was filed on November 20, 1998. Ex. 1027, codes (21), (22), (45). There is no dispute that Hardouin is prior art. *See generally* PO Resp.

Hardouin is titled "Automatic Shutoff for Wireless Endpoints in Motion." Ex. 1027, code (54). Hardouin "relates generally to wireless switching systems, and, in particular, to control of a wireless telephone." *Id.* at 1:5–6.

According to Hardouin, "[s]tudies have indicated that talking on a wireless telephone while driving increases the risk of an accident," and "[p]art of the increased risk is attributed to drivers being distracted by a wireless telephone ringing." Ex. 1027, 1:10–13. To mitigate this increased risk, Hardouin discloses "an apparatus and method in which a wireless telephone does not generate an alerting signal for an incoming call if the speed at which the wireless phone is moving exceeds a predefined speed." *Id.* at 1:25–29. "Advantageously, if an alerting signal is not generated for an incoming call, the wireless telephone transmits an audio message back to the calling party informing them that they have contacted the wireless telephone and may leave either a voice or data message." *Id.* at 1:29–34. "Further, the wireless telephone can inhibit the origination of calls from the wireless

telephone if the speed of the wireless telephone exceeds the predefined speed." *Id.* at 1:38–41.

Hardouin's Figure 1, reproduced below, shows a wireless telephone.

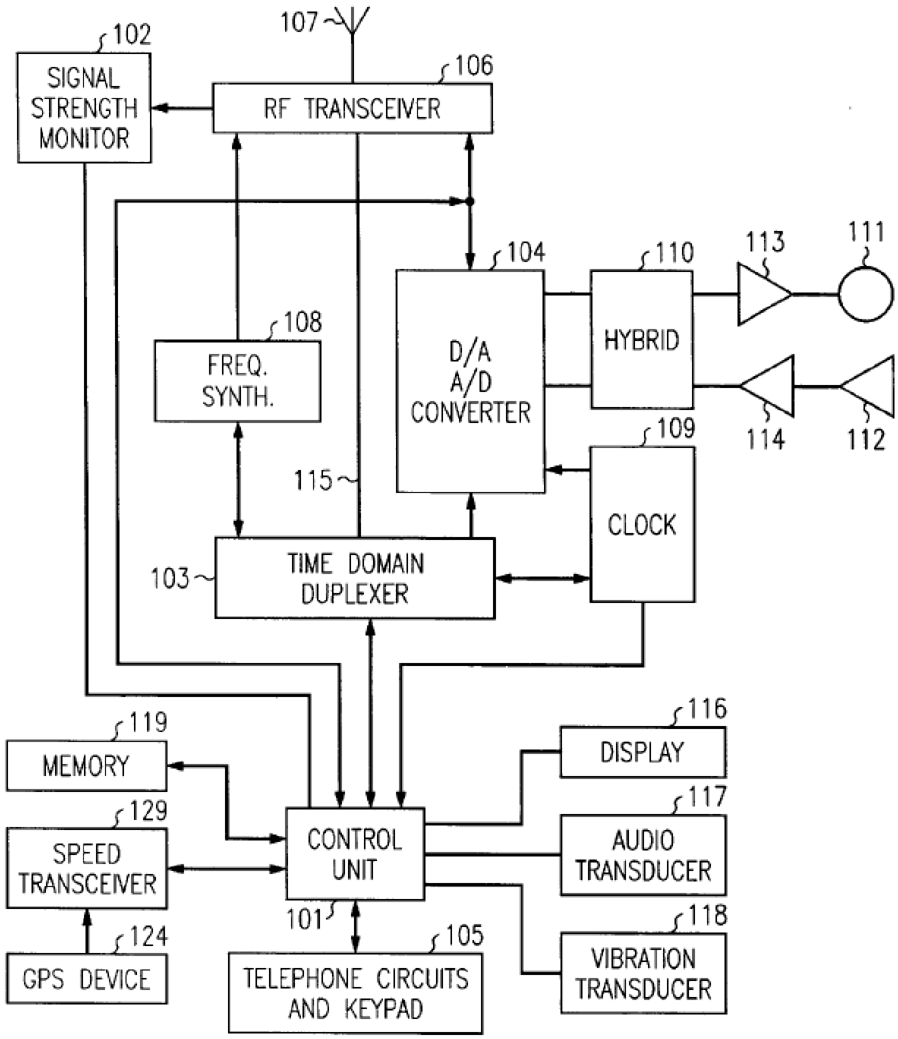

FIG. 1

Figure 1 is a block diagram illustrating a wireless telephone.

Ex. 2027, 1:50–51. As shown in Figure 1, the wireless telephone includes, *inter alia*, control unit 101, GPS device 124, and speed transceiver 129. "Speed transceiver 129 is designed to receive information that is used by

[the] control unit to calculate the speed at which the wireless terminal is traveling." *Id.* at 1:67–2:3. According to Hardouin:

> Control unit 101 is responsive to the changing position information from the GPS device to determine the speed at which the wireless telephone is moving. One skilled in the art can readily see that in the case of a wireless telephone that is designed to be connected to an automobile, that speed transceiver 129 could be receiving information from the speedometer of the automobile.

Id. at 2:8–15. "If control unit 101 determines that the speed is above a predefined amount, it does not alert the user of the wireless telephone via audio transducer 117 or vibration transducer 118." *Id.* at 2:17–20. "Rather, control unit 101 transmits a voice message to the caller defining that the call is not being answered because the user is presently driving." *Id.* at 2:20–22.

The steps performed by control unit 101 of the wireless telephone are shown in Figure 2, reproduced below.

FIG. 2

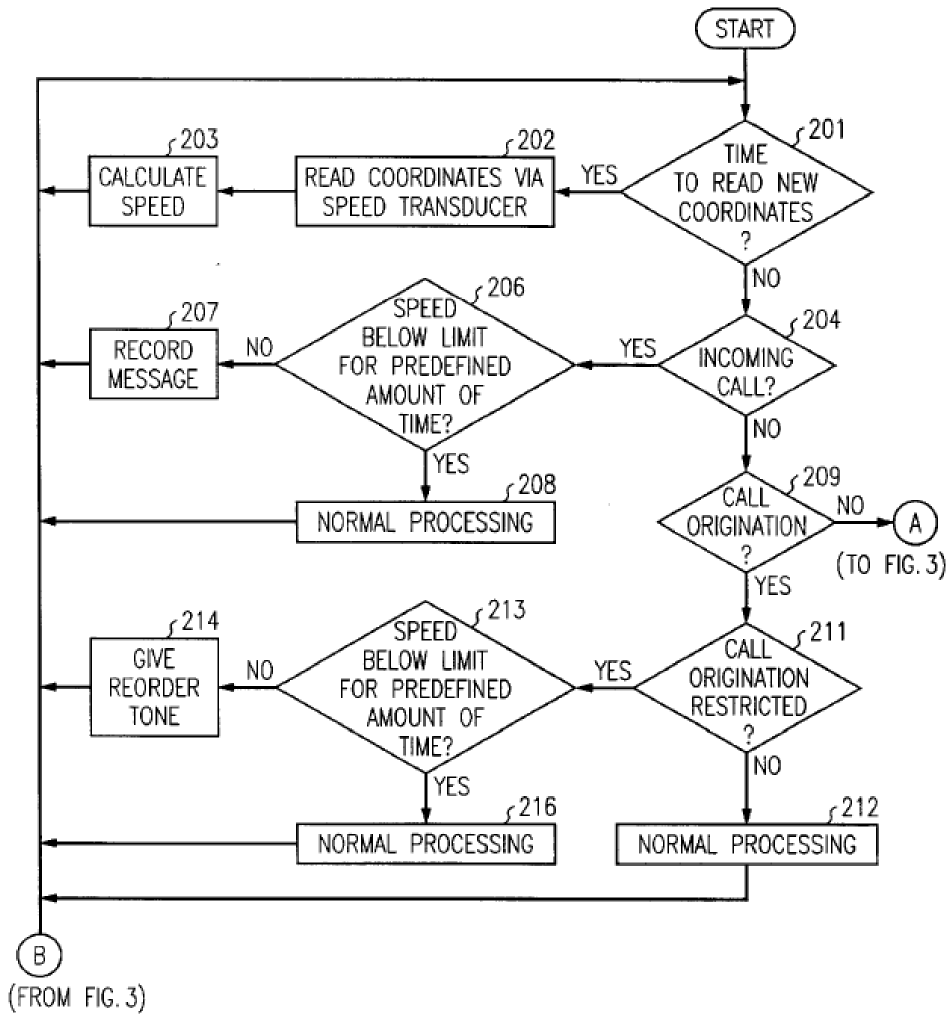

Figure 2 is a flow chart illustrating the steps performed by a wireless telephone. Ex. 1027, 1:52–53. In block 201, control unit 101 determines whether it is time to read new coordinates, and if so, speed transducer 129 reads coordinates from GPS device 124 in block 202. *Id.* at 2:41–47. Control unit 101 then, in block 203, calculates the speed based on the distance between new and old coordinates. *Id.* at 2:47–48. If it is not time to read new coordinates, control unit 101 determines, in block 204, whether an incoming call is being received. *Id.* at 2:52–54. If an incoming call is

being received, control unit 101, in block 206, determines whether the present speed is below a limit for a predefined amount of time. *Id.* at 2:54–56. If the speed is not below the limit, the caller is instructed to leave a message in block 207; otherwise normal call processing occurs in block 208. *Id.* at 2:56–65. If, at block 204, it was determined that no call is being received, then control unit 101 determines, in block 209, whether the wireless telephone user is attempting to make a call. *Id.* at 2:66–3:3. If the user is making a call, and call origination is restricted at speeds above the limit, as determined in block 211, then control unit 101 determines, in block 213, whether the present speed is below the limit for the predefined amount of time. *Id.* at 3:4–11. If the speed is not below the limit, "block 214 gives the user of the wireless telephone reorder tone before returning control back to decision block 201"; otherwise, normal call processing occurs in block 216. *Id.* at 3:11–15.

2. Independent Claim 1

Petitioner maps each element of independent claim 1 to Hardouin's disclosure. Pet. 35–50 (citing Ex. 1001, 4:40–45, 5:44–51, 6:13–17, claim 14; Ex. 1003 ¶¶ 217–229, 231–234, 236–241, 243–246, 248–249; Ex. 1027, 1:10–29, 1:38–43, 1:50–51, 1:64–65, 2:4–22, 2:30–32, 2:41–65, 4:4–9, 4:13–15, Abstract, claims 1, 2, Figs. 1–2). For a disclosure of the recited method for controlling a telematic device, Petitioner relies on Hardouin's wireless telephone system, which inhibits the wireless telephone's alert signal and the origination of calls from the wireless phone when the speed of the phone exceeds a predefined speed. *Id.* In particular, Petitioner relies on Hardouin's wireless telephone, alert signal, and inhibited alert signal for disclosing the recited telematic device, output having an

original format, and output having a format different than the original format, respectively. *Id.*

Patent Owner makes two arguments against Petitioner's contentions for independent claim 1.[17] PO Resp. 35–50. First, Patent Owner argues Hardouin's inhibited alert signal does not disclose the recited output in a format different from the original format. *Id.* at 35–47. Second, Patent Owner argues Hardouin's wireless telephone does not disclose the recited telematic device. *Id.* at 47–49.

We begin with Patent Owner's argument that Hardouin's wireless telephone does not disclose the recited telematic device, as it is similar to the argument Patent Owner raises with respect Arnold's travel guide system, which we address above in section III.D.2. Patent Owner's argument that Hardouin's wireless telephone does not disclose the recited telematic device is premised on its proposed construction of the claim term "telematic device" as a multifunction device integrating together at least the features of information, communication, computing, and entertainment technologies, which necessarily includes an audio and visual output. PO Resp. 47–50. Applying its construction of "telematic device," Patent Owner argues that Hardouin's wireless telephone is not a telematic device because it is "a limited function telephone that is described as having only *audio and tactile outputs* and a basic display for confirming keypad inputs . . . with no connection to any other automobile systems." *Id.* at 48 (citing Ex. 1027,

[17] Patent Owner specifically references claim elements 1.0 and 1.4 in making its arguments against Petitioner's contentions for independent claim 1. PO Resp. 38–50. For claim element 1.4, Patent Owner references its arguments for claim element 1.0. *Id.* at 50 (citing Ex. 2027 ¶¶ 102–103).

1:63–65, Fig. 1; Ex. 2027 ¶ 98). According to Patent Owner, Hardouin does not describe the wireless phone as having visual outputs for alerting a user. *Id.* (citing Ex. 2027 ¶ 98). Patent Owner also argues that Petitioner provides insufficient explanation as to why Hardouin's wireless telephone discloses the recited telematic device and applies the wrong meaning of the claim term. *Id.* at 48–49 (citing Pet. 36; Ex. 1003 ¶¶ 217–220; Ex. 2027 ¶¶ 99–101). Per Patent Owner, Petitioner's only explanation as to why Hardouin's wireless telephone discloses the recited telematics is a reference to the Specification's description of a telephone in a vehicle being a type of telematic device, and Patent Owner faults Petitioner for failing to compare Hardouin's wireless telephone with the telephone described in the Specification. *Id.*

In its Reply, Petitioner maintains that Hardouin discloses a wireless telephone, which the Specification describes as an example of a telematic device. Reply 19 (citing Ex. 1001, 17:14–20; Ex. 1027, 1:57–2:3). Petitioner also argues that Hardouin's wireless telephone discloses the recited telematic device even under Patent Owner's proposed construction because Hardouin's wireless phone includes GPS device 124 and is thus a multifunction device that can make and receive phone calls and utilize GPS coordinates. *Id.* (citing Ex. 1027, 2:4–51, Fig. 1).

In its Sur-reply, Patent Owner contends that Hardouin's wireless phone does not disclose the recited telematic device under its construction of "telematic device" as a multifunction telematic device that integrates together the features of information, communication, computing, and entertainment technologies because Petitioner has not shown that Hardouin's wireless phone employs entertainment technologies. Sur-reply 19.

Additionally, Patent Owner reiterates its argument that Hardouin's wireless telephone is a single function device. *Id.*

As set forth above in section III.C.1, we do not adopt Patent Owner's proposed construction of "telematic device." Rather, we construe "telematic device" as a telecommunications and informatics device. Under our construction, we are persuaded Hardouin's wireless telephone discloses the recited telematic device.

As an initial matter, we agree with Petitioner that the '170 patent describes a telephone in a vehicle, such as Hardouin's wireless telephone, as a telematic device. Pet. 36 (citing Ex. 1001, 6:13–17). Throughout it, the Specification describes a telephone as a telematic device. Ex. 1001, 1:29–35, 1:36–40, 5:38–51, 6:13–17, 6:56–64, 7:37–49, 7:60–62, 8:21–24, 9:18–30, 13:3–13, 13:19–23, 14:37–41, 15:65–16:3, 16:39–51, 16:64–17:2, 17:51–21, 18:29–34, 22:16–23. For example, the Specification describes "[t]he outputs from microprocessor 20 include control signals as shown by the following blocks: block 41, effective to *disable the telephone or other telematics* from making outgoing calls; block 42, effective to *disable the telephone or other telematics* from receiving incoming calls and from actuating the ringing signal . . . ." *Id.* at 13:3–13 (emphasis added).

That notwithstanding, Petitioner correctly argues that Hardouin's wireless phone includes a GPS device 124 that receives location coordinates. Pet. 30 (citing Ex. 1027, 1:50–51, Fig. 1); Reply 19 (citing Ex. 1027, 2:4–51, Fig. 1). Both Mr. Andrews and Mr. Peck testify that GPS systems were known to be telematic devices. Ex. 1003 ¶ 62; Ex. 2027 ¶ 30 (citing Ex. 2024). In addition to having GPS capabilities, Mr. Andrews testifies that mobile phones in 1990's, such as Hardouin's wireless phone, were

known to have 2G capabilities. To wit, Mr. Andrews testifies that 2G cellular services emerged around 1991, which is years before Hardouin's November 20, 1998, filing date, and that 2G services included short-messages services and the ability to access primitive web pages with a mobile phone via the Wireless Access Protocol (WAP). Ex. 1003 ¶ 92 (citing Ex. 1017, 20, 25, 305–306); Ex. 1027, code (22).

In view of the foregoing, we are persuaded Hardouin's wireless telephone is a telecommunications and informatics device. Thus, we are persuaded that Hardouin's wireless telephone discloses the recited telematic device.

We next consider Patent Owner's argument that Hardouin's inhibited alert signal does not disclose the recited output in a format different from the original format. Patent Owner contends preventing any input or output whatsoever is not the same as modifying the functional output of a multifunction telematic device to provide a more limited functional output that reduces distractions, as described in the '170 patent. PO Resp. 35–36 (citing Ex. 1001, 19:24–35; Ex. 2027 ¶ 73). Patent Owner further contends that "completely turning OFF the input and output of a mobile phone (*i.e.*, no output at all) is fundamentally different than providing a modified output as claimed (in a different format) that is either functional or informational in nature" because "'no output' has <u>no associated format</u>." *Id.* at 36 (citing Ex. 2027 ¶ 74). Patent Owner also contends Hardouin discloses completely turning OFF all outputs and inputs such that the phone is rendered substantially non-functional. *Id.* at 36–37 (citing Ex. 1027, 2:18–23, 3:1–15; Ex. 2027 ¶ 77). Patent Owner additionally contends that a telematic device in a preferred embodiment of the '170 patent includes an audio-visual user

interface which provides visual indicators of restricted output and that dependent claims 12–15 all specify modifying functional features to different output formats. *Id.* at 37–38 (citing Ex. 1001, 14:51–54, claims 12–15; Ex. 2027 ¶¶ 78–80).

With specific reference to claim element 1.0, Patent Owner asserts the Specification describes the telematic device's output is changed from a first, more functional format, to a second format that is more restricted but not completely non-functional. PO Resp. 39–40 (citing Ex. 1001, 18:3–7, 20:41–59, 21:60–22:6, claims 12–15; Ex. 2027 ¶¶ 82–83). Patent Owner also asserts Hardouin does not disclose an alternative functional output. *Id.* at 40–41 (citing Ex. 1027, 2:17–20; Ex. 2027 ¶ 84). Patent Owner maintains that "[t]he absence [of] output can't possibly teach the presence of a modified different output." *Id.* at 41 (citing Ex. 2027 ¶ 85). Patent Owner further asserts that completely muting the output does not teach changing the volume because muting the output is disabling the output, not changing it. *Id.* at 41–44 (citing Pet. 37; Ex. 1003 ¶¶ 226–229; Ex. 1027, 2:17–20; Ex. 2027 ¶¶ 86–90). Additionally, Patent Owner reiterates that dependent claims 12–15 all specify different functional output formats and asserts that claim 14, which recites the step of providing said at least one output to the driver in a different format includes muting the telematic device, does not preclude the alteration of presentation of other outputs such as display outputs. *Id.* at 45–46 (citing Ex. 1001, 23:50–65, claims 12–15; Ex. 2027 ¶¶ 91–92). Patent Owner also reiterates that Hardouin discloses completely disabling the input and output of the phone and lacks a visual component, which the recited different output format requires. *Id.* at 46–47 (citing

Ex. 1027, 1:13–16, 1:36–41, 2:26–29, 2:56–59, Abstract; Ex. 2027 ¶¶ 93–94).

In its Reply, Petitioner argues the intrinsic record, particularly claim 14, makes clear that the recited output in a different format includes muting the telematic device. Reply 19–21 (citing Ex. 1001, claims 1, 14). According to Petitioner, under the doctrine of claim differentiation, claim 14 states that muting the telematic device provides the at least one output to the driver in a different format as recited in independent claim 1. *Id.* at 20–21. Petitioner also argues Mr. Peck provides no meaningful testimony beyond the attorney arguments presented in Patent Owner's Preliminary Response (Paper 6, "Prelim Resp.") and instead virtually parrots the attorney arguments in the Preliminary Response, which the Board already considered in the Decision granting institution. *Id.* at 22–25 (citing Prelim. Resp. 6; Ex. 1048; Ex. 2027 ¶ 73).

In its Sur-reply, Patent Owner contends that independent claim 1 requires the same output be used as the basis for alternate output formats, whereas Petitioner relies on two completely different outputs, namely an alert signal and the absence of an alert signal. Sur-reply 20; *see also id.* at 21 (citing Ex. 1001, 20:38–42, Figs. 3–4) ("[B]ecause substantially the same output is specified as creating both the 'original format' and 'different format' outputs in elements specified in claim 1 originate from the same or similar information, and that output is presented as alternate versions of the same output that are 'rearranged,' 'repackaged' or 'recast' into the claimed 'different format' that is usually somewhat more restricted or simplified so that it is less distracting."). Patent Owner also contends the Specification does not describe muted output as a different format. *Id.* at 20–21 (citing

Ex. 1001, 8:5–10, 13:2–13, 13:36–37, 14:21–27, 14:39–41, 14:51–54, Figs. 3–4, boxes 53–54; Ex. 2025; Ex. 2027 ¶ 61). Patent Owner further contends an alert signal and a disabled alert signal are two different outputs, lack a common point of origin, and do not contain similar information. *Id.* at 22. In response to Petitioner's claim differentiation argument, Patent Owner contends that "disabling a phone and muting a telematic device as described in the ['170 patent] are substantially different from one another, so there is no meaningful application of the claim differentiation doctrine" and that "the scope of claim 1 will always be broader than any one feature from claim 14 and thus cannot be invalidated by only one feature." *Id.* at 23–24. In response to Petitioner's argument regarding Mr. Peck's testimony, Patent Owner contends that any concerns regarding Mr. Peck's testimony could have been addressed in a deposition and that Mr. Peck's opinions are consistent with certain arguments of lead counsel, who qualifies as a person of ordinary skill in the art. *Id.* at 24.

Beginning with Mr. Peck's testimony, our rules prescribe the standard by which we weigh testimony. Pursuant to 37 C.F.R. § 42.65(a), "(e)xpert testimony that does not disclose the underlying facts or data on which the opinion is based in entitled to little or no weight." We weigh Mr. Peck's testimony according to this standard.

Turning to whether Petitioner has shown that Hardouin's inhibited alert signal discloses the recited output in a format different from the original format, we agree with Petitioner that claim 14 informs as to the scope of the output in a different format recited in independent claim 1. Claim 14 depends from independent claim 1 and recites that the step of

providing said at least one output to the driver in a different format includes muting the telematic device. Ex. 1001, 23:55–61.

Although Patent Owner acknowledges that the step of providing said at least one output to the driver in a different format as recited in independent claim 1 is broad enough to encompass muting the telematic device as recited in claim 14, Patent Owner maintains that there can be no meaningful application of the doctrine of claim differentiation because disabling a phone and muting a telematic device are substantially different. Sur-reply 23. Patent Owner ostensibly contends that a telematic device necessarily includes multiple functional output formats, as shown by the Specification and claims 12–15, and that, with multiple functional output formats, muting the telematic device is not disabling the telematic device. PO Resp. 35–38, 45–47. We disagree with Patent Owner for at least two reasons. First, Patent Owner's argument is based on its proposed construction of "telematic device" as a multifunction device integrating together at least the features of information, communication, computing, and entertainment technologies, which necessarily includes an audio and visual output. As set forth above in section III.C.1, we do not adopt Patent Owner's proposed construction of "telematic device." Second, inhibiting the alert signal does not disable Hardouin's wireless telephone. To the contrary, Hardouin discloses that, when the speed is above a predetermined amount, control unit 101 does not alert the user and instead transmits a voice message to the caller defining that the call is not being answered because the user is presently driving. Ex. 1027, 2:17–21.

In view of the foregoing, we are persuaded that Hardouin discloses the recited output in a different format. In view of claim 14, the step of

providing said at least one output to the driver in a different format includes muting the telematic device. Petitioner correctly argues that Hardouin discloses inhibiting the wireless telephone's alert signal when the speed of the phone exceeds a predefined speed. Pet. 37 (citing Ex. 1027, 4:13–15), 45–46 (citing Ex. 1027, 2:17–22, 2:52–59). There is no dispute that inhibiting the wireless telephone's alert signal is muting the telephone. Thus, Petitioner has persuaded us that Hardouin's inhibited alert signal discloses the recited output in a different format.

After considering the parties' arguments and evidence, Petitioner has persuaded us that Hardouin discloses every element of independent claim 1. Specifically, we are persuaded that Hardouin's wireless telephone system, which inhibits the wireless telephone's alert signal when the speed of the phone exceeds a predefined speed, discloses the recited method for controlling a telematic device. Petitioner has shown, by a preponderance of the evidence, that the subject matter of independent claim 1 would have been obvious over Hardouin.

3. Independent Claim 31

Independent claim 31 is similar to independent claim 1 and likewise recites a method for controlling a telematic device in a vehicle operated by a driver. *Compare* Ex. 1001, 22:55–23:6, *with id.* at 25:4–18. However, instead of a telematic device with an output having an original format and a format different than the original format and preventing and providing output in the different formats based on the movement of the telematic device relative to a threshold as recited in independent claim 1, independent claim 31 recites a telematic device with an original input interface and an alternative input interface and changing the input interface based on the

movement of the telematic device relative to a threshold. *Id.* at 22:55–23:6, 25:4–18.

Petitioner maps each element of independent claim 31 to Hardouin's disclosure. Pet. 63–74 (citing Ex. 1001, 6:13–17, 9:18–22, 13:3–6; Ex. 1003 ¶¶ 231–234, 236–237, 309–324, 326–334, 336–338; Ex. 1027, 1:10–21, 1:38–43, 1:64–65, 2:29–38, 2:66–3:15, Abstract, claim 1, Figs. 1–2; Ex. 1037, 4:4–14). For a disclosure of the recited method for controlling a telematic device, Petitioner relies on Hardouin's wireless telephone system, which inhibits the origination of calls from the wireless phone when the speed of the phone exceeds a predefined speed. *Id.* In particular, Petitioner relies on Hardouin's wireless telephone, fully-enabled keypad, and disabled or partially-disabled keypad for disclosing the recited telematic device, original input interface, and alternative input interface, respectively. *Id.*

Patent Owner claims independent claim 31 is patentable over Hardouin for the same reasons as independent claim 1. PO Resp. 50–51 (citing Ex. 2027 ¶ 105); *see also id.* at 55–57 (citing Pet. 64; Ex. 1001, 1:16–24; Ex. 1003 ¶¶ 46–47, 309–312; Ex. 1027, 1:63–65, Abstract, Fig. 1; Ex. 2027 ¶¶ 117–123) (reiterating the argument for independent claim 1 that Hardouin's wireless telephone does not disclose the recited telematic device). We address Patent Owner's arguments for independent claim 1 in section III.E.2 above.

Patent Owner additionally contends Hardouin does not disclose the recited alternative input interface.[18] PO Resp. 51–58. Patent Owner argues

[18] Patent Owner specifically references claim elements 31.0 and 31.4 in contending that Hardouin does not disclose the recited alternative input interface. PO Resp. 51–58. For claim element 31.4, Patent Owner

the recited telematic device necessarily includes a multifunction input/output screen. *Id.* at 51–52 (citing Ex. 1001, 1:16–24, 3:29–34, 13:9–15, 14:19–27, 17:15–17, 18:25–34; Ex. 2027 ¶¶ 107–109). Patent Owner also argues the multifunction input/output screen must provide a visual output in both original and different formats that are at least partially functional. *Id.* at 52–54 (citing Ex. 1001, 14:39–54, 18:3–7, 20:33–59, 21:60–22:6, claim 27; Ex. 2027 ¶¶ 110–114). Patent Owner further argues that Petitioner does not point to any portion of Hardouin disclosing a visual input interface. *Id.* at 54 (citing Pet. 64–65; Ex. 1003 ¶¶ 314–315; Ex. 2027 ¶ 115). Patent Owner additionally argues that "a keypad as an input interface is immutable - it is always the same physical keypad and cannot be changed to *alternative input interface different than the original input interface* by simply disabling it" and that "once fully disabled, the keypad fails to be an input interface at all because it is simply incapable of any input (or output) function at this point, nor does it provide any information to a user." *Id.* (citing Ex. 2027 ¶ 116).

In its Reply, Petitioner argues that the alternative input interface recited in claim 31 and the different output format recited in independent claim 1 should be construed to have the same meaning because Patent Owner indicates they are related and similar in scope. Reply 22 (citing PO Resp. 2–3, 50–51).

In its Sur-reply, Patent Owner reiterates its argument that the original and alternative input interfaces recited in independent claim 31 are functional. Sur-reply 21. Patent Owner also argues "some form of

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references its arguments for claim element 31.0. *Id.* at 57–58 (citing Ex. 2027 ¶¶ 124–125).

alternative input interface must be present to have some sort of format." *Id.* at 22.

We disagree with Patent Owner's contention that Hardouin does not disclose the recited alternative input interface because it lacks a visual input interface. This argument is based on Patent Owner's proposed construction of "telematic device" as a multifunction device integrating together at least the features of information, communication, computing, and entertainment technologies, which necessarily includes an audio and visual output. As set forth above in section III.C.1, we do not adopt Patent Owner's proposed construction of "telematic device."

We also disagree with Patent Owner that Hardouin's keypad cannot provide different input interfaces. Although a keypad may not physically change, changing the functions associated with the keys thereon provides different input interfaces. *See* Ex. 1027, 1:64–65 (disclosing the keypad as part of the basic user interface); Ex. 1003 ¶¶ 319, 323 (Mr. Andrews testifying that Hardouin's keypad buttons would be operational to allow a driver to make a call when the speed of the vehicle is below a predefined speed and that Hardouin's keypad buttons would not be operational to allow a driver to make a call when the speed of the vehicle is above a predefined speed).

Moreover, Patent Owner's argument that the input interfaces must be at least partially functional and not disabled is beyond the scope of the claim. Independent claim 31 simply recites an original input interface and an alternative input interface, without any further description thereof. Ex. 1001, 25:4–18.

After considering the parties arguments and evidence, we are persuaded that Hardouin's disabled keypad discloses the recited alternative input interface. We agree with Mr. Andrews that the Specification does not describe an original input interface or an alternative input interface. Ex. 1003 ¶ 314. The Specification does describe disabling the telephone, and thereby preventing a driver from making and receiving calls, when certain conditions are present, including the vehicle traveling over a predetermined high velocity. Ex. 1001, 3:18–20, 13:3–6, 14:42–54; Figs. 2–3. Like the Specification, Hardouin discloses preventing a driver from being able to originate a call when the speed of the wireless telephone exceeds a predefined speed. Ex. 1027, 1:38–43, 2:30–38, 2:66–3:15, claim 1, Fig. 2. Hardouin also discloses a keypad is part of the basic user interface of the wireless telephone. *Id.* at 1:64–65, Fig. 1. We find credible Mr. Andrews's unrebutted testimony that an ordinary artisan would have understood Hardouin's keypad as an input allowing operation of the telephone. Ex. 1003 ¶ 313. We also find credible Mr. Andrews's unrebutted testimony that Hardouin discloses the keypad buttons would be operational to allow a driver to make a call when the speed of the vehicle is below a predefined speed and that Hardouin further discloses the keypad buttons do not allow a driver to make a call when the speed of the vehicle is above a predefined speed. *Id.* ¶¶ 319, 323. As Hardouin discloses a keypad is an input interface that enables different operations of the telephone depending on the speed of the vehicle, Petitioner has persuaded us that Hardouin discloses an input interface having an original input interface and an alternative input interface, as recited in independent claim 31.

In view of the foregoing, Petitioner has persuaded us that Hardouin discloses every element of independent claim 31. Specifically, we are persuaded that Hardouin's wireless telephone system, which inhibits the origination of calls from the wireless phone when the speed of the phone exceeds a predefined speed, discloses the recited method for controlling a telematic device. Petitioner has shown, by a preponderance of the evidence, that the subject matter of independent claim 31 would have been obvious over Hardouin.

4. Claims 2–4, 10, 14, 16, 17, and 19–21

For claim 2, which recites preventing an attempted input or output in response to a sensed condition being outside of a threshold and permitting access to the input or communication of the output after the sensed condition is within the threshold, Petitioner argues Hardouin discloses preventing a user from playing messages on a wireless telephone and using the wireless telephone's keypad to originate a call when the speed of the wireless telephone is above a predefined speed. Ex. 1001, 23:7–14; Pet. 50–55 (citing Ex. 1003 ¶¶ 253–261; Ex. 1027, 1:38–43, 1:62–65, 2:30–32, 2:39–3:33, claim 1, Figs. 1–3).

Claim 3 depends from claim 2 and recites that the method further includes the step of "delaying access to a prevented input or communication of a prevented output from the telematic device for a predetermined period after the movement of the telematics device is below the threshold limit." Ex. 1001, 23:15–19. For the step recited in claim 3, Petitioner argues that Hardouin's wireless telephone system allows normal processing of the wireless telephone if the wireless telephone is travelling below a predefined

speed threshold for a predefined amount of time. Pet. 56–57 (citing Ex. 1003 ¶¶ 264–265; Ex. 1027, 2:33–39, 3:16–33, claim 1, Fig. 2).

Claim 4 depends from claim 2 and recites that the method further includes the step of "enabling an output detectable by the driver of the vehicle, and said output provides information to the driver as to a driving modification that can be made to re-enable the suppressed input or output." Ex. 1001, 23:20–24. For the step of claim 4, Petitioner argues Hardouin's wireless telephone system enables a reorder tone when accessing stored messages while the speed of the wireless telephone is above a threshold for a predetermined amount of time and will permit access to the messages once the speed is below the threshold for a predetermined amount of time. Pet. 57 (citing Ex. 1003 ¶¶ 269–270; Ex. 1027, 3:16–33, Fig. 3). According to Petitioner, "this tone would be *an output* that *provides information* indicating to the driver that they should slow down and drive below the limit (*i.e.*, threshold) speed for a predetermined amount of time to listen to the stored messages." *Id.* at 58 (citing Ex. 1003 ¶ 271).

For claim 10, which recites providing the driver a signal that the movement of the telematic device is at or above a threshold, Petitioner relies on Hardouin's reorder tone. Ex. 1001, 23:43–45; Pet. 58–59 (citing Ex. 1003 ¶¶ 254–258, 274–275; Ex. 1027. 3:16–33, Fig. 3)

For claim 14, which recites that the step of providing said at least one output to the driver in a different format comprises selecting at least one from the group consisting of, *inter alia,* changing the volume, changing the tactile feedback, and muting the telematic device, Petitioner argues Hardouin discloses inhibiting the alert signal if the detected speed had not been equal to or less than the predefined speed. Ex. 1001, 23:55–61; Pet. 59 (citing

Ex. 1027, 4:13–15, 2:17–20). According to Petitioner, "[a]n ordinary artisan would have understood when the wireless device is travelling above a predefined speed, Hardouin will: (1) *change the volume* of the 'audio transducer'; (2) *mute the volume* of the 'audio transducer' and/or (3) inhibit (*change*) the 'vibration transducer' from providing a *tactile feedback* of an incoming call." Pet. 59 (citing Ex. 1003 ¶¶ 226–229, 278–279).

Claim 16 depends from independent claim 1 and recites that the step of permitting the driver to access said input or providing said output to said driver only when the movement of the telematics device is below the threshold is "delayed for a period of time." Ex. 1001, 23:66–24:2. For claim 16, Petitioner relies on its arguments for claim 3. Pet. 60 (citing Ex. 1003 ¶¶ 264–265, 282–285).

Claim 17 depends from independent claim 1 and recites that the step of permitting the driver to access said input or providing said output to said driver only when the movement of the telematics device is below the threshold comprises "a driver initiated action." Ex. 1001, 24:3–7. For claim 17, Petitioner argues Hardouin's wireless telephone system prevents a driver from being able to operate the wireless telephone's keypad to originate a call when the speed of the wireless telephone exceeds a predefined speed. Pet. 60 (citing Ex. 1027, 2:66–3:15, claim 1). Per Petitioner, "Hardouin therefore teaches *a driver initiated action* (*e.g.*, slowing the vehicle down below the threshold speed for a pre-determined amount of time) permitting access to the *input* (keypad) to originate a phone call." *Id.* (citing Ex. 1003 ¶¶ 287–288).

Claim 19 depends from independent claim 1 and recites that the method further comprises the step of "transmitting data remotely."

Ex. 1001, 24:11–12. For the step recited in claim 19, Petitioner argues Hardouin's wireless telephone system transmits an audio message back to the calling party, which informs the party to leave a message, when the wireless telephone is traveling above a predefined speed. Pet. 61 (citing Ex. 1003 ¶¶ 292–295; Ex. 1027, 1:29–34, 2:4–5, 2:22–24).

For claim 20, which recites that the step of downloading data, software, operating system, or new application, Hardouin's wireless telephone system prompts a caller to leave a message and records and stores the message in memory 119. Ex. 1001, 24:13–15; Pet. 62 (citing Ex. 1027, 2:24–26, 2:59–62). According to Petitioner:

> An ordinary artisan would have understood the data provided by the caller would be downloaded by the telephone and made available to the driver when the vehicle speed is below the predefined speed threshold. The downloaded message would be received as *data* that is downloaded and then stored into Hardouin's memory.

Pet. 62 (citing Ex. 1003 ¶¶ 298–301).

Claim 21 depends from independent claim 1 and recites that the method further comprises the step of "making data available to a remote party." Ex. 1001, 24:16–17. For the recited step of claim 21, Petitioner argues Hardouin's wireless telephone system transmits an audio message back to the calling party, which informs the party to leave a message, when the wireless telephone is traveling above a predefined speed. Pet. 62–63 (citing Ex. 1003 ¶¶ 304–307; Ex. 1027, 1:29–34, 2:4–5, 2:17–33).

Patent Owner does not present arguments for claims 2–4, 10, 14, 16, 17, and 19–21 apart from its arguments for independent claim 1. *See, e.g.*, PO Resp. 50 (arguing "[d]ependent claims 2-4, 10, 14[,] 16-17, [and] 19-21 are therefore patentable for at least the same reasons [as independent

claim 1], and no further discussion of additional reasons for patentability is deemed necessary at this time"). We address Patent Owner's arguments for independent claim 1 above in section III.E.2.

After considering the parties' arguments and evidence, Petitioner has persuaded us that Hardouin's wireless telephone system discloses the steps recited in claims 2–4, 10, 14, 16, 17, and 19–21. Petitioner has shown, by a preponderance of the evidence, that the subject matter of claims 2–4, 10, 14, 16, 17, and 19–21 would have been obvious over Hardouin.

F. OBVIOUSNESS BASED ON HARDOUIN AND TRAUNER—CLAIM 13

Petitioner challenges claim 13 under 35 U.S.C. § 103(a), contending the claimed subject matter would have been obvious in view of Hardouin, Trauner, and the knowledge of an ordinary artisan. Pet. 74–77; Reply 25. Patent Owner argues claim 13 is patentable over Hardouin and Trauner for the same reason independent claim 1 is patentable over Hardouin. PO Resp. 58; Sur-reply 24.

As we discuss Hardouin above in section III.E.1, we begin our analysis of this asserted ground of unpatentability with an overview of Trauner. We then turn to the parties' contentions for claim 13.

1. Trauner

Trauner is the June 13, 2002, publication of U.S. Application No. 09/735,825, filed on December 12, 2000. Ex. 1029, codes (21), (22), (43). There is no dispute that Trauner is prior art. *See generally* PO Resp.

Trauner is titled "Automatic Display Control System." Ex. 1029, code (54). Trauner relates to "a vehicular information and display system whose function is dependent on the state of the vehicle" and more particularly relates such a system that "activates the display only when the

vehicle is stopped or moving at a velocity below a minimum that can be imposed by law." *Id.* ¶ 2.

Trauner's system is shown in Figure 1, reproduced below:

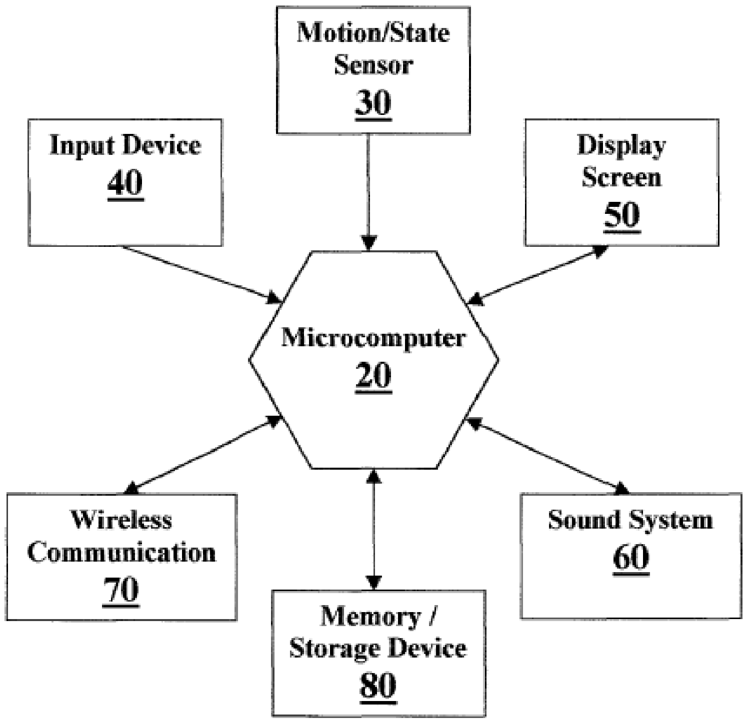

Figure 1

Figure 1 is a block diagram showing the key components of the system. Ex. 1029 ¶ 10. As shown in Figure 1, the system includes microprocessor 20 that controls system operation, vehicle state/motion sensor 30, input device 40 such as a keyboard, display screen 50, sound system 60, wireless communications device 70 that allows the system to communicate with cell phones and Internet providers, and memory 80. *Id.* ¶¶ 7, 12, 16.

According to Trauner, when the vehicle is in motion, the keyboard and display are inhibited to prevent the driver from being distracted while

driving. Ex. 1029 ¶ 7. Trauner also teaches that voice synthesizing software and speakers allow screen-blank-hidden data to be read aloud. *Id.* ¶ 17.

2. Claim 13

Claim 13 depends from independent claim 1 and recites that the method further comprises the step of "having an incoming text based message read." Ex. 1001, 23:53–54. For the recited step of claim 13, Petitioner argues both Hardouin and Trauner disclose a vehicular telephone system that improves driver safety by suppressing telephone calls when the vehicle is traveling above a predefined speed. Pet. 75 (citing Ex. 1027, 1:10–22; Ex. 1029, Abstract). Petitioner further argues both Hardouin and Trauner disclose a telephone that is disabled when a driver attempts to operate the telephone above the speed threshold. *Id.* (citing Ex. 1003 ¶¶ 341–342; Ex. 1029 ¶¶ 17–18. Petitioner also argues that Trauner teaches reading aloud text based messages like e-mail and weather information and that Hardouin discloses a caller can leave the caller's telephone number when the telephone's operation has been disabled due to the vehicle travelling above the predefined speed. *Id.* at 75–76 (citing Ex. 1027, 2:24–33; Ex. 1029 ¶ 17).

According to Petitioner, it would have been obvious to combine the teachings of Hardouin and Trauner so that text based messages such as the caller's telephone number could be read to the driver when the telephone operation is disabled. Pet. 76 (citing Ex. 1003 ¶¶ 343–345). Petitioner argues an ordinary artisan would have been motivated to combine the teachings of Hardouin and Trauner to reduce the risk of distracted drivers. *Id.* at 76–77 (citing Ex. 1003 ¶¶ 346–349; Ex. 1026, 5:41–49).

Patent Owner does not present arguments for claim 13 apart from its arguments for independent claim 1 with respect to Hardouin. PO Resp. 58; Sur-reply 24. We address Patent Owner's arguments for independent claim 1 above in section III.E.2.

After considering the parties' arguments and evidence, Petitioner has persuaded us that the recited step of claim 13 is found in its proposed combination of Hardouin and Trauner, and Petitioner has provided persuasive reasoning as to why a person of ordinary skill in the art would have combined the teachings of Hardouin and Trauner to result in the subject matter of claim 13. Petitioner has shown, by a preponderance of the evidence, that the subject matter of claim 13 would have been obvious over Hardouin and Trauner.

G. Obviousness Based on Hardouin and Krüger—Claim 4

Petitioner challenges claim 4 under 35 U.S.C. § 103(a), contending the claimed subject matter would have been obvious in view of Hardouin, Krüger, and the knowledge of an ordinary artisan. Pet. 77–80; Reply 25. Patent Owner argues claim 4 is patentable over Hardouin and Krüger for the same reason independent claim 1 is patentable over Hardouin. PO Resp. 59; Sur-reply 24.

As we discuss Hardouin above in section III.E.1, we begin our analysis of this asserted ground of unpatentability with an overview of Krüger. We then turn to the parties' contentions for claim 4.

3. Krüger

Krüger issued as U.S. Patent No. 7,711,355 B1 on May 4, 2010, from U.S. Application No. 09/621,085, filed on July 21, 2000. Ex. 1026,

codes (21), (22), (45). There is no dispute that Krüger is prior art. *See generally* PO Resp.

Krüger is titled "Device Used in a Vehicle Which is Controlled by Vehicular Operation to Avoid Dangerous Vehicular Operation." Ex. 1026, code (54). Krüger "contributes to the safe and/or convenient use of operable devices in or under conditions that require the full . . . attention of a user to be directed elsewhere." *Id.* at 1:9–11.

According to Krüger, if an operable device, such as telephone or stereo, is installed in a vehicle, it is not acceptable, from a safety standpoint, that the driver make a call or change a cassette while operating the vehicle. Ex. 1026, 1:23–26. To provide an operable device that takes both safety and convenience aspects into consideration, Krüger discloses a decision unit that blocks or releases certain operating states of the operable device based on received data. *Id.* at 1:52–61.

Krüger's decision unit is present in a motor vehicle, which is shown in Figure 1, reproduced below.

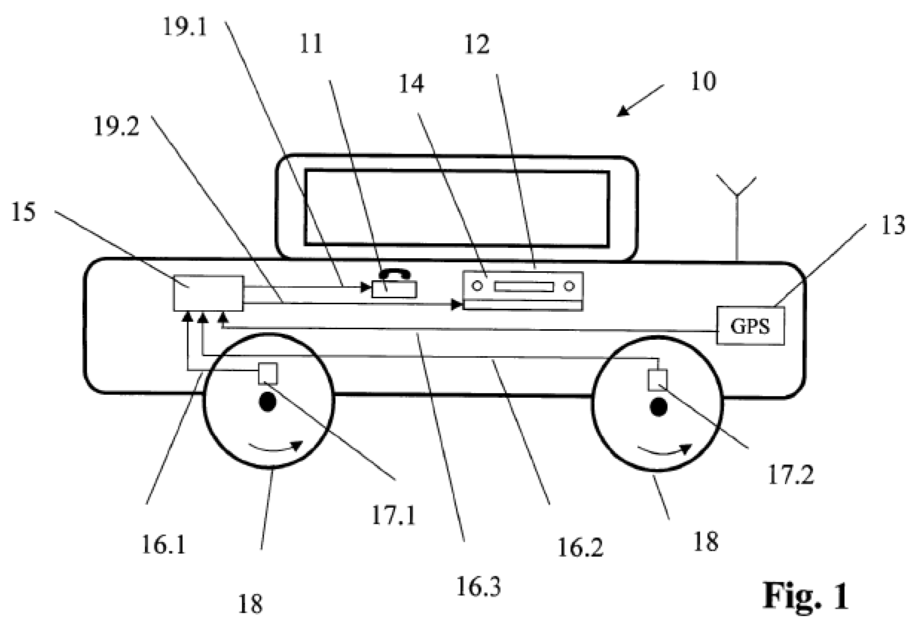

Fig. 1

Figure 1 is a diagram of a motor vehicle. Ex. 1026, 2:3, 2:11. As shown in Figure 1, motor vehicle 10 includes decision unit 15 and three operable devices: car phone 11, car radio 12, and navigation system 13. *Id.* at 2:11–16, 2:19. Decision unit 15 is connected to sensors 17.1, 17.2 via wires 16.1, 16.2. *Id.* at 2:19–20. Sensor 17.1 determines the speed of vehicle 10, and sensor 17.2 determines whether the brakes have been activated. *Id.* at 2:21–23. Decision unit 15 is also connected to car phone 11 via data line 19.1 and to car radio 12 via data line 19.2. *Id.* at 2:37–39.

Krüger discloses an Example 1 where sensor 17.1 continuously transmits vehicle speed values to decision unit 15, which functions as a threshold switch. Ex. 1026, 2:48–51.

> If the threshold switch is provided with speed values from sensor 17.1 that are over the speed of 130 km/h that is considered dangerous, then a signal is triggered and is transmitted on the data lines 19.1, 19.2. This signal then blocks the operation of the operating panel 14 on the car radio 12 and prevents telephone calls from being made in the vehicle 10 and from being received in the vehicle 10.

Id. at 2:51–57. According to Example 1 of Krüger, "[i]f the telephone function of the car phone 12 or the operability of the car radio 11 is suspended due to the current vehicle speed, the driver can be optically or acoustically informed of this state at the same time the signal is transmitted on the data lines 19.1, 19.2." *Id.* at 3:3–7.

4. Claim 4

For claim 4, which recites the step of enabling an output providing information to the driver as to a driving modification that can re-enable the suppressed input or output, Petitioner argues both Hardouin and Krüger disclose a vehicular telephone system that suppresses telephone calls when

the vehicle is traveling above a predefined speed. Ex. 1001, 23:20–24; Pet. 78 (citing Ex. 1026, Abstract). Petitioner further argues both Hardouin and Krüger disclose notifying a driver when the operation of a device is disabled. *Id.* Petitioner also argues that Krüger teaches expressly informing a driver that the vehicle speed needs to be reduced to operate the telephone. Pet. 78 (citing Ex. 1026, 3:3–20). According to Petitioner, an ordinary artisan would have been motivated to modify Hardouin to include Krüger's teaching of expressly informing a driver that the vehicle speed needs to be reduced to operate the telephone to prevent distraction and improve safety. *Id.* at 78–80 (citing Ex. 1003 ¶¶ 352–356; Ex. 1027, 2:66–3:33, Fig. 2).

Patent Owner does not present arguments for claim 4 apart from its arguments for independent claim 1 with respect to Hardouin. PO Resp. 59; Sur-reply 24. We address Patent Owner's arguments for independent claim 1 above in section III.E.2.

After considering the parties' arguments and evidence, Petitioner has persuaded us that the recited step of claim 4 is found in its proposed combination of Hardouin and Krüger, and Petitioner has provided persuasive reasoning as to why a person of ordinary skill in the art would have combined the teachings of Hardouin and Krüger to result in the subject matter of claim 4. Petitioner has shown, by a preponderance of the evidence, that the subject matter of claim 4 would have been obvious over Hardouin and Krüger.

IV. PETITIONER'S MOTION TO EXCLUDE

Petitioner moves to exclude Exhibits 2030–2032. Mot. 1. Exhibit 2030 is page 5 of U.S. Provisional Patent Application No. 60/336,293. Exhibit 2031 is a Supplemental Declaration of John Peck,

and Exhibit 2032 is U.S. Patent No. 8,301,108 B2 ("the '108 patent"). Patent Owner filed these exhibits on October 11, 2022, with its Sur-reply. Petitioner timely objected to the exhibits on October 12, 2022. Paper 18. Petitioner asserts that it requested Patent Owner withdraw the exhibits on the same day, which Patent Owner declined to do. Ex. 1050, 1. Patent Owner, ultimately, maintained the Sur-reply and exhibits as filed. Mot. 1.

Petitioner requests that we exclude Exhibits 2030–2032 because they are new evidence other than deposition transcripts of the cross-examination of a reply witness, and are prohibited under 37 C.F.R. § 42.23(b), as explained in our Consolidated Trial Practice Guide. Mot. 1. Patent Owner opposes the Motion, asserting that it submitted Exhibits 2030–2032 not as new evidence, but as rebuttal evidence to what it deemed to be new arguments raised in Petitioner's Reply. Opp. 1.

Petitioner is correct that our rules, as explained in our Consolidated Trial Practice Guide, prohibit submitting new evidence (without authorization) with a sur-reply other than deposition transcripts of the cross-examination of a reply witness. *See* 37 C.F.R. § 42.23(b); CTPG 73–74. The Consolidated Trial Practice Guide explains:

> Sur-replies to principal briefs (i.e., to a reply to a patent owner response or to a reply to an opposition to a motion to amend) normally will be authorized by the scheduling order entered at institution. *The sur-reply may not be accompanied by new evidence other than deposition transcripts of the cross-examination of any reply witness*. Sur-replies should only respond to arguments made in reply briefs, comment on reply declaration testimony, or point to cross-examination testimony. As noted above, a sur-reply may address the institution decision if necessary to respond to the petitioner's reply. This sur-reply practice essentially replaces the previous practice of filing observations on cross-examination testimony.

> Generally, a reply or sur-reply may only respond to arguments raised in the preceding brief. 37 C.F.R. § 42.23, except as noted above. "Respond," in the context of 37 C.F.R. § 42.23(b), does not mean proceed in a new direction with a new approach as compared to the positions taken in a prior filing. While replies and sur-replies can help crystalize issues for decision, a reply or sur-reply that raises a new issue or belatedly presents evidence may not be considered. The Board is not required to attempt to sort proper from improper portions of the reply or sur-reply.

CTPG 73–74 (emphasis added).

Patent Owner asserts that the '108 patent (Ex. 2032) shares a specification with the '170 patent and that many of the claims from the '108 patent were included in the record as Exhibit 2017 (infringement contentions from district court litigation). Opp. 2. Patent Owner maintains the '108 patent is not new evidence but was "added . . . for the Board's convenience." *Id.* We find unpersuasive Patent Owner's assertion that Exhibit 2032 is not new. The evidence was not newly discovered (based on Patent Owner's assertion), yet the exhibit was not made of record prior to Patent Owner filing it with its Sur-reply. It was submitted with the Sur-reply as new evidence. Also, Patent Owner argues that Exhibit 2031 is submitted to demonstrate new arguments by Petitioner to which it responds. *Id.* at 3–5.

Patent Owner does not contend nor do we find that Exhibits 2030–2032 are deposition transcripts of the cross-examination of any reply witness. Moreover, a supplemental declaration by an expert witness is not a proper way to identify or object to what a party perceives to be "new arguments" in a reply. *See* CTPG 73–75. Thus, the exhibits were improperly submitted, without authorization, and in violation of our rules and guidance.

Our rules and Consolidated Trial Practice Guide are clear on this prohibition. And, the Consolidated Trial Practice Guide explains: "[w]here a party believes it has a basis to request relief on a ground not identified in the rules, the party should contact the Board and arrange for a conference call with the Board and opposing party to discuss the requested relief with the judge handling the proceeding." CTPG 75. Thus, the Board identifies appropriate ways for a party to address matters that it considers to be beyond the specific procedures outlined in the rules. Merely submitting new evidence was not authorized by Board rules or guidance and Patent Owner did not seek authorization to file the new evidence.

The facts warrant excluding Exhibits 2030–2032 and we *grant* the Motion. *See* CTPG 81.

V. CONCLUSION

Petitioner has proven, by a preponderance of the evidence, that claims 1–4, 6, 10, 12–14, 16, 17, 19–21, and 31 are unpatentable, but has not proven, by a preponderance of the evidence, that claim 15 is unpatentable.[19] Our final decision is summarized as follows:

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[19] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 2, 6, 10, 12–15, 20	103(a)	Arnold	1, 2, 6, 10, 12–14, 20	15
1–4, 10, 14, 16, 17, 19–21, 31	103(a)	Hardouin	1–4, 10, 14, 16, 17, 19–21, 31	
13	103(a)	Hardouin, Trauner	13	
4	103(a)	Hardouin, Krüger	4	
Overall Outcome			1–4, 6, 10, 12–14, 16, 17, 19–21, 31	15

Further, we grant Petitioner's Motion to Exclude for the reasons set forth above.

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has proved by a preponderance of the evidence that claims 1–4, 6, 10, 12–14, 16, 17, and 19–21 of the '170 patent are unpatentable;

FURTHER ORDERED that Petitioner has not proved by a preponderance of the evidence that claim 15 of the '170 patent is unpatentable;

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2; and

FURTHER ORDERED that Petitioner's Motion to Exclude is *granted*.

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US009047170B2

(12) **United States Patent**
Naboulsi

(10) **Patent No.: US 9,047,170 B2**
(45) **Date of Patent: *Jun. 2, 2015**

(54) **SAFETY CONTROL SYSTEM FOR VEHICLES**

(71) Applicant: **Mouhamad Ahmad Naboulsi**, West Bloomfield, MI (US)

(72) Inventor: **Mouhamad Ahmad Naboulsi**, West Bloomfield, MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **13/663,085**

(22) Filed: **Oct. 29, 2012**

(65) **Prior Publication Data**

US 2013/0124038 A1 May 16, 2013

Related U.S. Application Data

(60) Division of application No. 10/838,708, filed on May 4, 2004, now Pat. No. 8,301,108, which is a

(Continued)

(51) **Int. Cl.**
G06F 17/00 (2006.01)
G08B 21/06 (2006.01)

(Continued)

(52) **U.S. Cl.**
CPC ***G06F 17/00*** (2013.01); *B60R 11/0264* (2013.01); *B60R 2011/001* (2013.01); ***G08B 21/06*** (2013.01)

(58) **Field of Classification Search**
USPC 701/36, 41, 29.1, 408, 468; 455/345, 455/411, 556.1, 557, 565, 567, 569.1, 455/569.2, 575.9; 340/438, 441, 525, 575, 340/576, 901
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,103,438	A	7/1914	Scheibert
3,223,926	A	12/1965	Maugans

(Continued)

FOREIGN PATENT DOCUMENTS

DE	10352733	A1	10/2004
JP	62-048845		3/1987

(Continued)

OTHER PUBLICATIONS

Delphi Corporation Selected to Lead Comprehensive Driver Distraction Research Program; Delphi News Release; Oct. 30, 2002; (3 pages), Troy, Michigan.

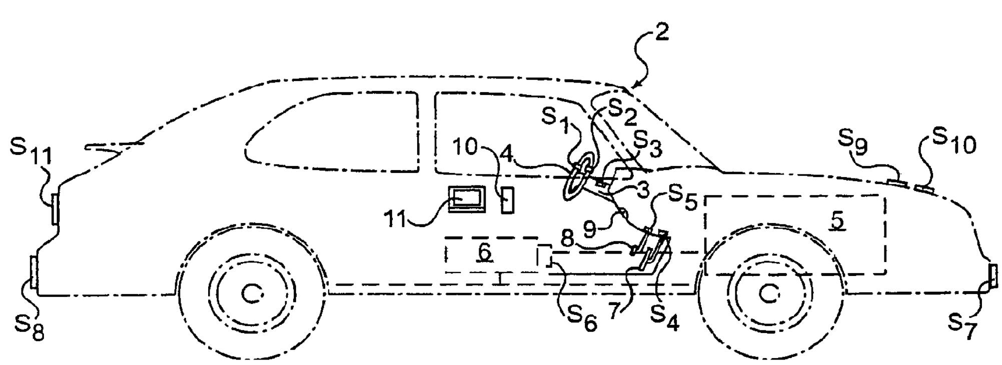
(Continued)

Primary Examiner — Richard Camby
(74) *Attorney, Agent, or Firm* — Vivacqua Law, PLLC; Raymond J. Vivacqua; Pete N. Kiousis

(57) **ABSTRACT**

According to one aspect of one embodiment of the present invention, a safety control system for vehicles, includes, a communication device having at least one of an input accessible from within the vehicle and an output communicated within the vehicle, at least one sensor operable to sense at least one condition related to vehicle operation, and a controller communicated with the sensor and the communication device to selectively suppress at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold. When an input is suppressed, the driver is prevented from accessing or inputting information into the communication device. When an output is suppressed, communication between the device and the driver of a vehicle is suppressed to, among other things, avoid distracting the driver during certain driving situations or conditions relating to the driver, vehicle and/or environment.

31 Claims, 5 Drawing Sheets



Related U.S. Application Data

continuation of application No. 10/287,299, filed on Nov. 4, 2002, now Pat. No. 6,731,925, which is a continuation of application No. 10/279,447, filed on Oct. 24, 2002, now abandoned.

(60) Provisional application No. 60/336,293, filed on Oct. 24, 2001, provisional application No. 60/390,877, filed on Jun. 21, 2002.

(51) **Int. Cl.**

B60R 11/02	(2006.01)
B60R 11/00	(2006.01)

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,485,375	A	11/1984	Hershberger	
4,572,207	A	2/1986	Yoshimi et al.	
4,649,282	A	3/1987	Ota et al.	
5,266,922	A	11/1993	Smith et al.	
5,301,227	A	4/1994	Kamei et al.	
5,453,929	A	9/1995	Stove	
5,521,580	A	5/1996	Kaneko et al.	
5,543,591	A	8/1996	Gillespie et al.	
5,812,698	A	9/1998	Platt et al.	
5,813,989	A	9/1998	Saitoh et al.	
5,855,144	A	1/1999	Parada	
5,880,411	A	3/1999	Gillespie et al.	
5,897,505	A	4/1999	Feinberg et al.	
5,915,561	A	6/1999	Lorenzana et al.	
5,936,518	A	8/1999	Fukui et al.	
5,978,737	A	11/1999	Pawlowski et al.	
6,028,271	A	2/2000	Gillespie et al.	
6,085,078	A	7/2000	Stamegna	
6,085,278	A	7/2000	Gates et al.	
6,104,101	A	8/2000	Miller et al.	
6,107,922	A	8/2000	Bryuzgin	
6,114,949	A	9/2000	Schmitz et al.	
6,145,082	A	11/2000	Gannon et al.	
6,147,315	A	11/2000	Rudolph et al.	
6,148,251	A	11/2000	Downs	
6,154,123	A	11/2000	Kleinberg	
6,154,658	A	11/2000	Caci	
6,166,656	A	12/2000	Okada et al.	
6,188,315	B1	2/2001	Herbert et al.	
6,209,767	B1	4/2001	Liou	
6,240,347	B1	5/2001	Everhart et al.	
6,246,933	B1	6/2001	Bague	
6,249,720	B1	6/2001	Kubota et al.	
6,253,131	B1	6/2001	Qugley et al.	
6,256,558	B1	7/2001	Sugiura et al.	
6,263,190	B1	7/2001	Mamori et al.	
6,282,906	B1	9/2001	Cauchy	
6,292,719	B1	9/2001	Seto et al.	
6,308,115	B1	10/2001	Yamaguchi et al.	
6,335,689	B1	1/2002	Mine	
6,339,700	B1	1/2002	Tsai	
6,353,778	B1	3/2002	Brown	
6,373,472	B1	4/2002	Palalay et al.	
6,380,931	B1	4/2002	Gillespie et al.	
6,381,966	B1	5/2002	Barrow	
6,414,671	B1	7/2002	Gillespie et al.	
6,418,362	B1	7/2002	St. Pierre et al.	
6,430,488	B1	8/2002	Goldman et al.	
6,434,450	B1	8/2002	Griffin, Jr. et al.	
6,434,459	B2	8/2002	Wong et al.	
6,438,465	B2	8/2002	Obradoyich et al.	
6,502,022	B1	12/2002	Chastain et al.	
6,526,762	B1	3/2003	Barrow	
6,556,810	B2	4/2003	Suzuki	
6,575,902	B1	6/2003	Burton	
6,580,973	B2	6/2003	Leivian et al.	
6,580,984	B2	6/2003	Fecher et al.	
6,600,975	B2	7/2003	Moriguchi et al.	
6,610,936	B2	8/2003	Gillespie et al.	
6,611,752	B1	8/2003	Bartlett	
6,665,600	B2	12/2003	Miller et al.	
6,675,082	B2	1/2004	Galli et al.	
6,687,497	B1	2/2004	Parvulescu et al.	
6,732,534	B2	5/2004	Spry	
6,756,903	B2	6/2004	Omry et al.	
6,771,946	B1	8/2004	Oyaski	
6,775,603	B2	8/2004	Yester et al.	
6,791,462	B2	9/2004	Choi	
6,810,309	B2	10/2004	Sadler et al.	
6,812,942	B2	11/2004	Ribak	
D500,639	S	1/2005	Cauchy et al.	
6,842,677	B2	1/2005	Pathare	
6,871,067	B2	3/2005	Clark et al.	
6,880,941	B2	4/2005	Suggs	
6,882,906	B2	4/2005	Geisler et al.	
6,886,060	B2	4/2005	Wang et al.	
6,886,653	B1	5/2005	Bellehumeur	
6,892,116	B2	5/2005	Geisler et al.	
6,895,316	B2	5/2005	Chen et al.	
6,909,650	B2	6/2005	Ryu et al.	
6,909,947	B2	6/2005	Douros et al.	
6,946,966	B2	9/2005	Koenig	
6,968,311	B2	11/2005	Knockeart et al.	
6,973,323	B2	12/2005	Oesterling et al.	
6,974,414	B2	12/2005	Victor	
7,006,793	B2	2/2006	Himmel et al.	
7,009,488	B2	3/2006	Schwartz et al.	
7,019,623	B2	3/2006	Klausner et al.	
7,020,499	B2	3/2006	Moffi et al.	
7,049,941	B2	5/2006	Rivera-Cintron et al.	
7,054,723	B2	5/2006	Seto et al.	
7,062,365	B1	6/2006	Fei	
7,068,167	B2	6/2006	Brunner	
7,084,773	B2	8/2006	Oyama	
7,116,989	B2	10/2006	Mazzara et al.	
7,120,785	B1	10/2006	Bowers et al.	
7,133,753	B2	11/2006	Nakajima et al.	
7,194,347	B2	3/2007	Harumoto et al.	
7,218,213	B2	5/2007	Katagiri et al.	
7,243,012	B2	7/2007	Miyake et al.	
7,280,852	B2	10/2007	Shimizu et al.	
7,295,904	B2	11/2007	Kanevsky et al.	
7,308,247	B2	12/2007	Thompson et al.	
7,321,825	B2	1/2008	Ranalli	
7,349,782	B2	3/2008	Churchill et al.	
7,627,427	B2 *	12/2009	Nichols et al.	701/517
7,688,244	B2	3/2010	Lee et al.	
2001/0002449	A1	5/2001	Eisenmann et al.	
2001/0016789	A1	8/2001	Staiger	
2002/0069071	A1	6/2002	Knockeart et al.	
2002/0075168	A1	6/2002	Ablay et al.	
2002/0091706	A1	7/2002	Anderson et al.	
2002/0111725	A1	8/2002	Burge	
2002/0116156	A1	8/2002	Remboski et al.	
2002/0120371	A1	8/2002	Leivian et al.	
2002/0120374	A1	8/2002	Douros et al.	
2002/0180608	A1	12/2002	Omry et al.	
2003/0014521	A1	1/2003	Elson et al.	
2003/0065432	A1	4/2003	Shuman et al.	
2003/0073406	A1	4/2003	Benjamin et al.	
2003/0169181	A1	9/2003	Taylor	
2003/0169522	A1	9/2003	Schofield et al.	
2003/0179233	A1	9/2003	McWalter et al.	
2003/0179773	A1	9/2003	Mocek et al.	
2003/0182032	A1	9/2003	McWalter et al.	
2003/0182233	A1	9/2003	Mocek et al.	
2003/0182360	A1	9/2003	Mocek et al.	
2003/0187571	A1	10/2003	Impson et al.	
2003/0191569	A1	10/2003	Su et al.	
2003/0210150	A1	11/2003	Benedict	
2003/0216136	A1	11/2003	McBrearty et al.	
2004/0000992	A1	1/2004	Cuddihy et al.	
2004/0039509	A1	2/2004	Breed	
2004/0044454	A1	3/2004	Ross et al.	
2004/0088084	A1	5/2004	Geisler et al.	
2004/0122562	A1	6/2004	Geisler et al.	
2004/0167680	A1	8/2004	Nakajima et al.	

(56) **References Cited**

U.S. PATENT DOCUMENTS

2004/0198306	A1	10/2004	Singh et al.
2004/0204795	A1	10/2004	Harvey et al.
2004/0204796	A1	10/2004	Harvey et al.
2004/0236474	A1	11/2004	Chowdhary et al.
2004/0236475	A1	11/2004	Chowdhary
2004/0236476	A1	11/2004	Chowdhary
2004/0243292	A1	12/2004	Roy
2005/0021190	A1	1/2005	Worrell et al.
2005/0030184	A1	2/2005	Victor
2006/0094412	A1	5/2006	Nonoyama et al.
2006/0095848	A1	5/2006	Naik
2006/0202842	A1	9/2006	Sofer
2007/0073944	A1	3/2007	Gormley
2007/0152803	A1	7/2007	Huang et al.
2007/0167147	A1	7/2007	Krasner et al.
2008/0125102	A1	5/2008	Abel et al.
2009/0006678	A1	1/2009	Mishima

FOREIGN PATENT DOCUMENTS

JP	09-011772	1/1997
JP	09-292261	11/1997
JP	2000-172195	6/2000
JP	2000-301964	10/2000
JP	2001-045181	2/2001
JP	2001-239897	9/2001

OTHER PUBLICATIONS

Volvo Owners Club, Volvo Press Releases; Sep. 8, 2003; (9 pages) United Kingdom.
UK Debut for All-New Volvo S40 at Scottish Motor Show; Oct. 20, 2003; (2 pages), United Kingdom.
Duncan Graham-Rowe; Smart Assistant Will Cut Driver Distraction (NewScientist.com); Dec. 7, 2003 (2 pages).
Edwin Bastiaensen; PReVENT Intergrated Project for Active Safety Gets Underway (its@ertico); Feb. 3, 2004; (3 pages), Europe.
Memorandum of Understanding for Realisation of Interoperable In-Vehicle eCall (Safety Forum eCall Driving Group); May 28, 2004; (7 pages), Europe.
Dr. Juergen Schwarz; Response 3—Code of Practice for Development, Validation and Market Introduction of ADAS—A PReVENT Project (DaimlerChrysler AG); Jun. 3, 2005; (9 pages), Stuttgart, Germany.
Maria Rimini-Doering, et al.; I-TSA Traffic Safety Assessment in a Simulator Experiment with Integrated Information and Assistance Systems (Fourth International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design); Jul. 9-12, 2007; (9 pages), Stevenson, Washington.
New Solution to Texting While Driving can Save Lives (CummingHome); Jul. 11, 2007; (2 pages), Georgia.
Wheel (Version: 12); Author Unknown, Date Unknown, Where Published Unknown.

* cited by examiner

FIG - 1

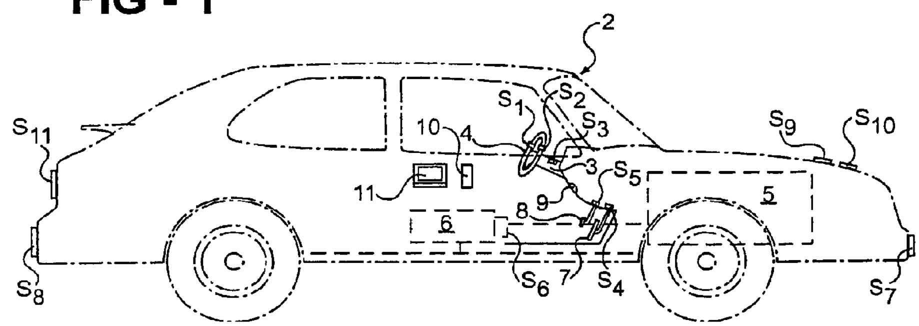
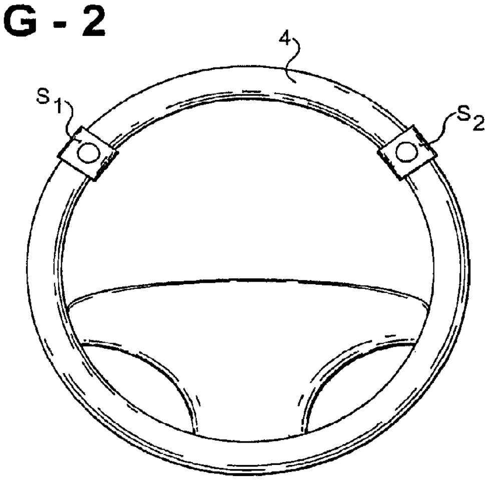


FIG - 2



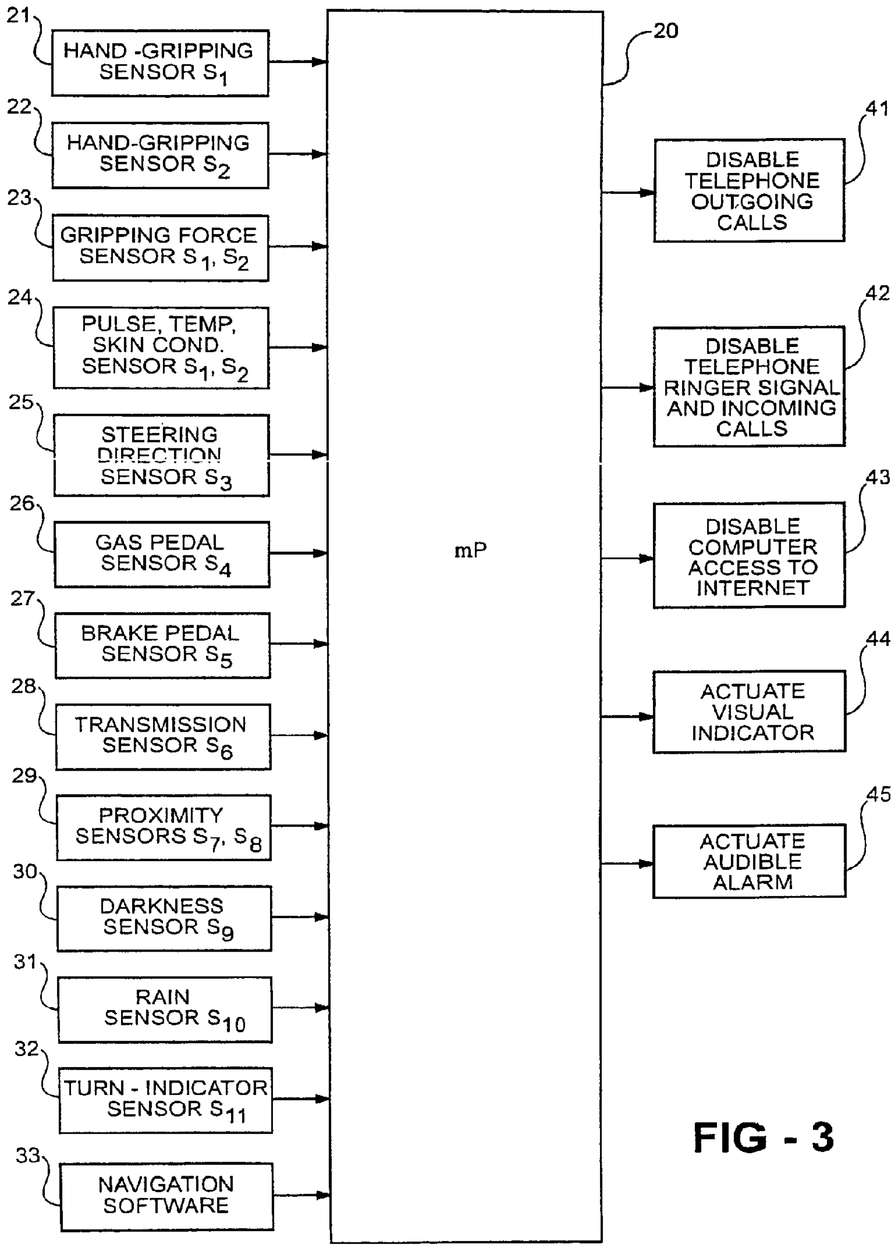
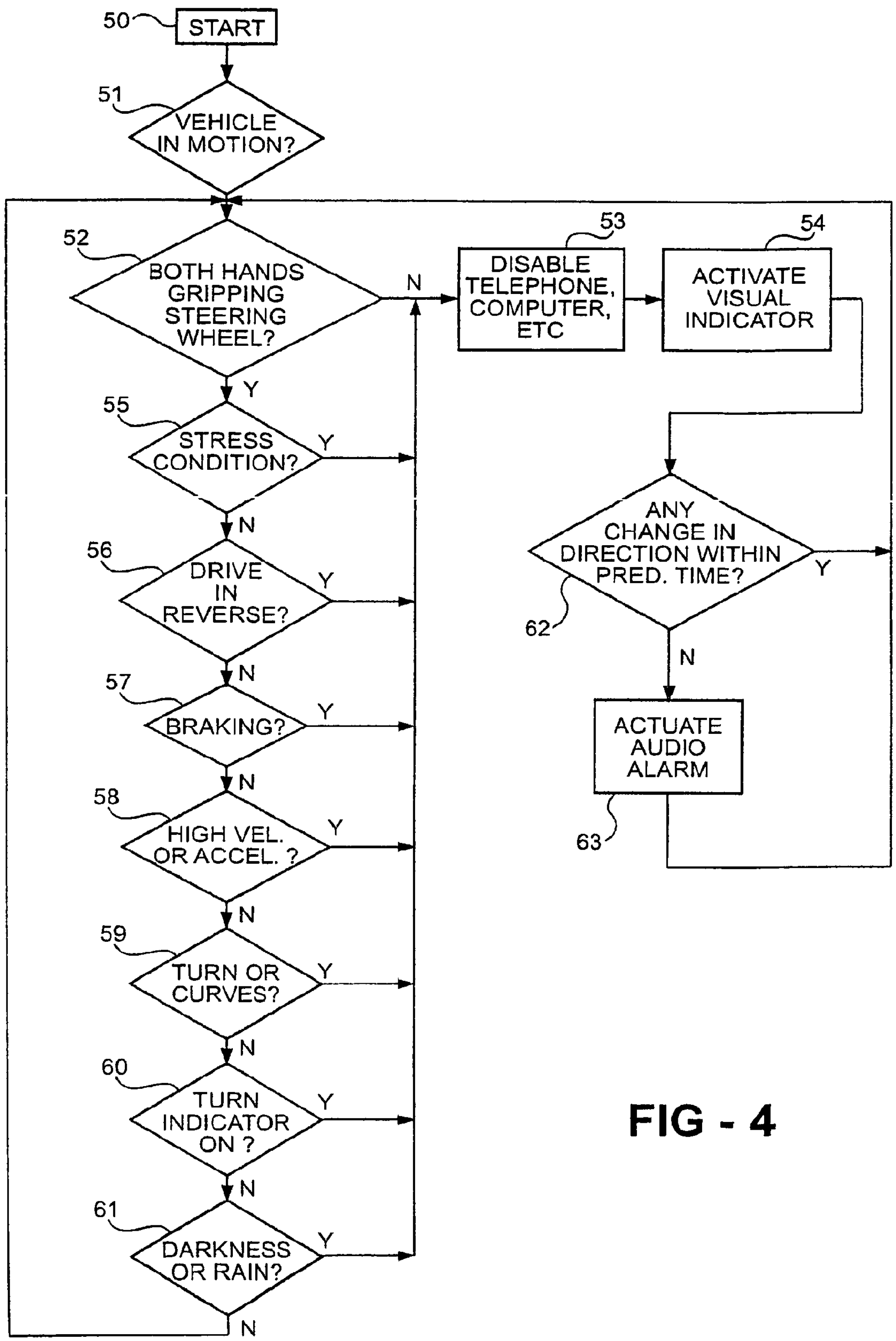
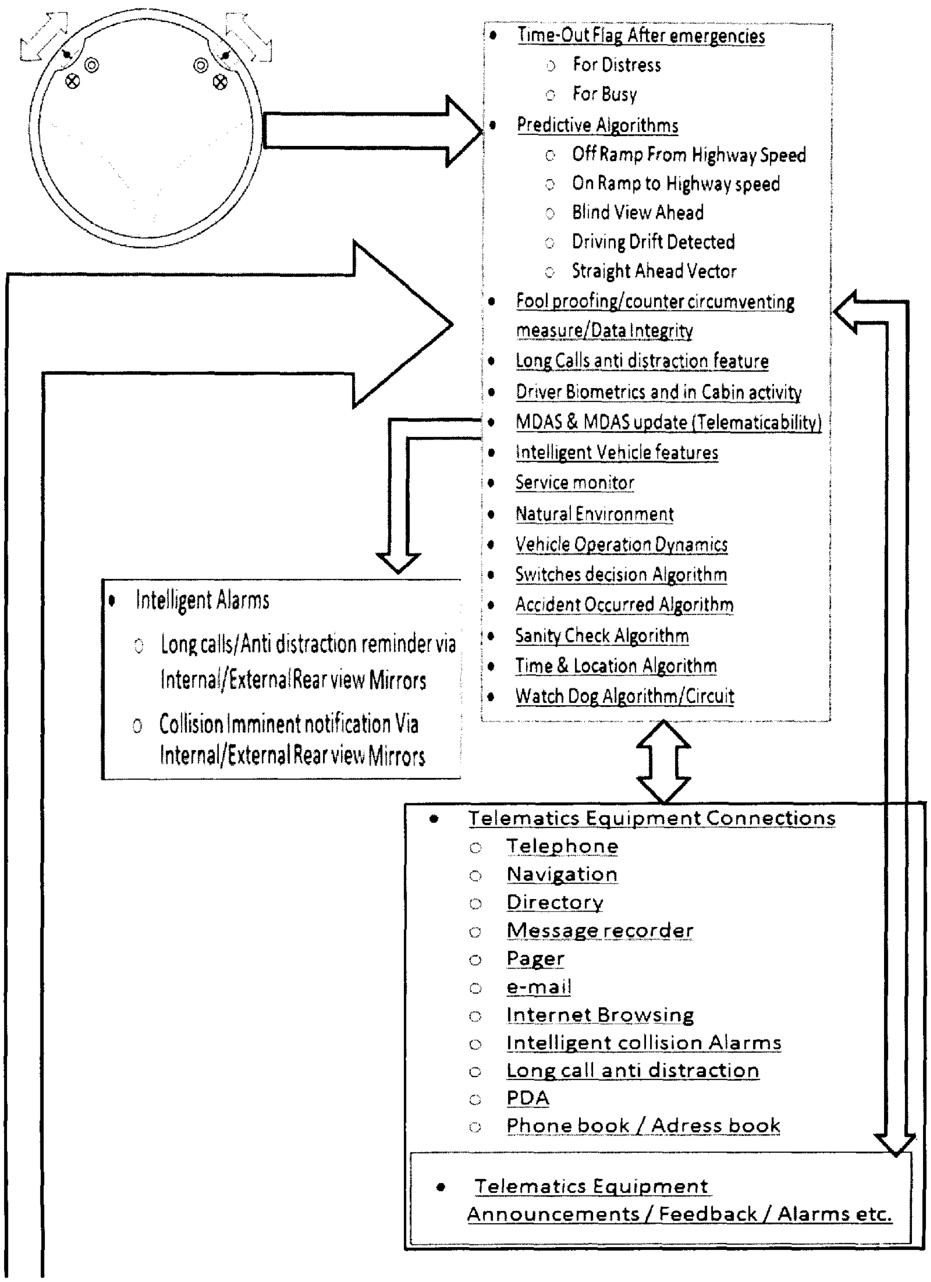

21
HAND -GRIPPING SENSOR S_1
22
HAND-GRIPPING SENSOR S_2
23
GRIPPING FORCE SENSOR S_1, S_2
24
PULSE, TEMP, SKIN COND. SENSOR S_1, S_2
25
STEERING DIRECTION SENSOR S_3
26
GAS PEDAL SENSOR S_4
27
BRAKE PEDAL SENSOR S_5
28
TRANSMISSION SENSOR S_6
29
PROXIMITY SENSORS S_7, S_8
30
DARKNESS SENSOR S_9
31
RAIN SENSOR S_{10}
32
TURN - INDICATOR SENSOR S_{11}
33
NAVIGATION SOFTWARE
20
mP
41
DISABLE TELEPHONE OUTGOING CALLS
42
DISABLE TELEPHONE RINGER SIGNAL AND INCOMING CALLS
43
DISABLE COMPUTER ACCESS TO INTERNET
44
ACTUATE VISUAL INDICATOR
45
ACTUATE AUDIBLE ALARM

FIG - 3



50
START
51
VEHICLE IN MOTION?
52
BOTH HANDS GRIPPING STEERING WHEEL?
N
Y
53
DISABLE TELEPHONE, COMPUTER, ETC
54
ACTIVATE VISUAL INDICATOR
55
STRESS CONDITION?
Y
N
56
DRIVE IN REVERSE?
Y
N
57
BRAKING?
Y
N
58
HIGH VEL. OR ACCEL. ?
Y
N
59
TURN OR CURVES?
Y
N
60
TURN INDICATOR ON ?
Y
N
61
DARKNESS OR RAIN?
Y
N
ANY CHANGE IN DIRECTION WITHIN PRED. TIME?
Y
62
N
ACTUATE AUDIO ALARM
63

FIG - 4



Time-Out Flag After emergencies
For Distress
For Busy
Predictive Algorithms
Off Ramp From Highway Speed
On Ramp to Highway speed
Blind View Ahead
Driving Drift Detected
Straight Ahead Vector
Fool proofing/counter circumventing measure/Data Integrity
Long Calls anti distraction feature
Driver Biometrics and in Cabin activity
MDAS & MDAS update (Telematicability)
Intelligent Vehicle features
Service monitor
Natural Environment
Vehicle Operation Dynamics
Switches decision Algorithm
Accident Occurred Algorithm
Sanity Check Algorithm
Time & Location Algorithm
Watch Dog Algorithm/Circuit
Intelligent Alarms
Long calls/Anti distraction reminder via Internal/External Rear view Mirrors
Collision Imminent notification Via Internal/External Rear view Mirrors
Telematics Equipment Connections
Telephone
Navigation
Directory
Message recorder
Pager
e-mail
Internet Browsing
Intelligent collision Alarms
Long call anti distraction
PDA
Phone book / Adress book
Telematics Equipment Announcements / Feedback / Alarms etc.

Figure 5A

From BUS or SENSOR OR CALCULATED VALUES

Drive
- Parking Gear
- Neutral Gear
- Drive Gear
- Clutch depressed (M/T Only)
- Transmission Shift UP/Down
- Brake activation
- G Force/Two planes
- Throttle position, position/time
- Gas Pedal position, position/time
- Valves Intake / Exhaust position sensor
- Tachometer-Engine RPM rate/time
- Valves intake/Exhaust position sensor
- Tachometer-Engine RPM rate/time
- Automatic Transmission Flywheel dynamic change in Pressure sensor Change in Centripital force.
- Steering member angle, angle/time
- Inclinometer
- Rollover sensor
- Airbag deployment
- Roll/Bank
- Tires Pressure, FR, FL, RR, RL

Active Driver Assistant Systems
- ABS activation Signal(time)
- Adaptive/Intelligent cruise control
- Night vision
- Traction Control signal
- ESP/Stability controls/Anti Roll
- Intersection Collision Warning
- Lane/Road departure

Environment
- Lighting condition Night/Day
- Wiper Setting
- High beam light
- Fog Lamp
- HVAC Setting
- Total Vehicle Weight
- Vehicle speed
- Number of Passengers
- Bearing/Longitude/Latitude/Altitude
- Proximity Alarm, Front Rear Blind spot

Busy
- Turning signal Left/Right
- Emergency Flasher
- HVAC activation
- Wiper activation
- Intelligent food and beverage holder
- Driver Seat Belt
- Accessories activation
- Horn activation
- ISORSP, ISORSU, ISORSD, SSORSP, SSORSU, SORD

Annoyances
- Dog Strap
- Child Crying
- Dog barking detector
- Cigarette smoke

Physiology
- Alcohol Level
- Heart Rate
- Pressure on Steering Mechanism
- Sweat sensor
- Driver Temperature
- Voice Monitor

Security
- Driver Seat Position/Recliner Sensor
- Driver Seat/Back weight Sensor
- Steering Tilt wheel position

Figure 5B

SAFETY CONTROL SYSTEM FOR VEHICLES

REFERENCE TO CO-PENDING APPLICATIONS

The present application is a divisional of U.S. patent application Ser. No. 10/838,708 filed May 4, 2004 (now U.S. Pat. No. 8,301,108) which is a continuation of U.S. patent application Ser. No. 10/287,299, filed Nov. 4, 2002 (now U.S. Pat. No. 6,731,925), which claims the benefit of a priority from U.S. patent application Ser. No. 10/279,447, filed Oct. 24, 2002, Provisional Application No. 60/390,877 filed Jun. 21, 2002, and Provisional Application No. 60/336,293 filed Oct. 24, 2001, the contents of which are incorporated herein by reference.

FIELD OF THE INVENTION

The present invention relates to the field of telematics, namely to the field of integrating information, communication, computing and entertainment technologies into vehicles for civilian or military use. The invention particularly relates to safety control systems for vehicles to reduce driver distraction, avoiding potentially dangerous conditions tending to produce accidents.

BACKGROUND OF THE INVENTION

One potentially dangerous condition is the use of a vehicle telephone by the vehicle driver while driving the vehicle. The use of telematics in general and particularly cellular telephones by drivers while driving has been found to increase the possibility of an accident since such a telephone not only diverts the driver's attention from driving, but also generally requires the use of at least one of the driver's hands and distract the driver's eyes from the road and traffic. In fact, many states and countries have enacted legislation requiring that telephones used in vehicles by drivers while driving must be of the "hands free" type and usually telematics equipment carries a warning to educate and discourage the driver about the risk of using these devices while driving. However, such legislation is difficult to enforce and education is not usually effective in assuring driver compliance. Moreover, even where the vehicle is equipped with a "hands free" telephone, drivers nevertheless still frequently use one hand for holding or dialing the telephone. When one hand is occupied by holding a telephone, the danger of causing an accident in an emergency situation is increased because of the additional reaction time required to properly grip the steering wheel with both hands. Similar danger exists when the driver attempts to control audio and video equipment, e.g. Radio, Music CD, DVD, Books on tape etc., or when the driver attempts to change environmental controls like adjusting the heat or air conditioning, or other vehicle settings.

There are other potentially dangerous conditions and inherent risks in driving that depends on the driving act itself, such as rapidly accelerating or decelerating, excessive maneuvering, merging to or exiting a freeway, passing, changing lanes, changing gears, depressing the clutch, driving at high speed, negotiating a turn, braking, reverse-driving, or a stress condition on the part of the driver, that could increase the possibility of an accident should the driver be distracted by activation of the telephone or other signal or device. This inherent risk is also dependent on the driving purpose as well, for example, the risk in driving a police cruiser is inherently riskier then in driving a sedan, and driving a delivery van has different risk than driving the family van.

Herbert et al., U.S. Pat. No. 6,188,315 and Brown, U.S. Pat. No. 6,353,778, disclose systems for avoiding preset potentially dangerous conditions while operating a vehicle having a vehicle telephone, but the systems described in those patents are of relatively limited application, and do not provide for avoiding dangerous conditions or to managing risk and individualizing the warnings to individual driving skills or application and to combinations of events and environmental conditions.

SUMMARY OF THE INVENTION

An object of at least some presently preferred embodiments of the present invention is to provide a safety control system for vehicles tending to reduce the possibility of accidents in one or more of the above respects. Another object of at least some presently preferred embodiments of the invention is to provide a method of reducing or avoiding driver distraction during potentially dangerous conditions encountered while operating a vehicle.

According to one aspect of one embodiment of the present invention, a safety control system for vehicles, includes, a communication device having at least one of an input accessible from within the vehicle and an output communicated within the vehicle, at least one sensor operable to sense at least one condition related to vehicle operation, and a controller communicated with the sensor and the communication device to selectively suppress at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold. When an input is suppressed, the driver is prevented from accessing or inputting information into the communication device. When an output is suppressed, communication between the device and the driver of a vehicle is suppressed to, among other things, avoid distracting the driver during certain driving situations or conditions.

According to one aspect of one embodiment of the present invention, there is provided a safety control system for vehicles including a telephone or other input or output device and one or more sensors for sensing instantaneous driver stimuli and/or a potentially dangerous condition and for automatically disabling or suppressing the telephone or other input or output device when sensing such stimuli and condition. In one form, the sensors include two sensors mounted on a steering member to provide an indication of the presence of the driver's hands on the vehicle steering member, and effective to suspend use of the telephone or other input/output device when the two hands of the driver are not sensed as present on the steering member while the vehicle is in motion. This system is modular, dynamic, interactive, and adaptive to each individualized user. In one implementation, the invention employs a method for automated machine prioritizing to provide assistance to the to driver and optimize the functionality of telematics features accessibility by arranging them according to a user's needs and preferences based on usage frequency of individual features and/or application or as customized individually by the user preferences, skills and events. In another embodiment, sensors on a steering member are used to measure changes in driver physiology. Other methods can be used for sensing driver physiology, e.g. via infrared detection, camera and image/color recognition etc.

Smart Speaker: Incoming calls are routed to a speaker that reflects and bounce sounds of front windshield at driver Look Ahead, Eye Level. Or simulate such action so that a driver focuses or has his/her attention directed toward the windshield just like he would do if he is carrying a conversation with another person.

According to further aspects in the described preferred embodiment, the steering member is a steering wheel, and the sensors include two sensors on opposite sides of the steering wheel located to sense the presence of the driver's hands on the steering wheel. Preferably, the two sensors are located approximately on or between the "two" and "ten" and the "three" and "nine" clock positions of the steering wheel.

It will thus be seen that such a system, requiring both hands to be on the steering wheel in order for the driver to operate the input/output devices, not only requires the vehicle to be equipped with a "hands free" interface for the input/output devices, or a system that can be used as such with an adapter or when docked to the system gateway, but also enforces the use of the "hands free" feature by sensing that the driver actually has both hands placed on the steering member before the input/output devices can be operated accessed or displayed to the driver. Disabling the operation of the device would preferably include not only disabling making outgoing and receiving incoming telephone calls, but also disabling the signal (typically audible tones, vibrations, or visible light) of an incoming call, fax, e-mail, the display of non-urgent vehicle status or warning indicators, since such signals, indicators or displays can distract the driver. Such distractions are problematic at times and conditions wherein operation of the vehicle requires more than usual driver attention and interaction, or when other distractions are already present for the driver.

According to further features in the described preferred embodiment, the vehicle may also include a computer or the driver may also use a portable multi-function telematics device in the vehicle allowing access to the Internet or other network for transmitting and/or receiving faxes or e-mail or browsing the web or accessing a WAN, with the sensors also disabling driver initiated access to such devices when the two hands of the driver are not sensed on the steering member while the vehicle is in motion.

In most cases, the steering member would be a steering wheel as presently included in conventional vehicles. However, in certain applications the steering member could be a joystick, or other type of steering member. In such case, the sensors are placed in areas a driver is recommended or required to grip the steering member to safely control the vehicle.

According to further optional features in the preferred embodiment of the invention described below, the sensors may further include devices for sensing vehicle acceleration, deceleration, merging onto or exiting a freeway, passing, changing lanes, changing gears, depressing the clutch, a reverse-drive condition of the vehicle, the braking of the vehicle, the undue proximity of the vehicle to another vehicle, excessive maneuvering, and/or an unduly high velocity of the vehicle, any one of which conditions, or combination of conditions, may also be effective to disable the operation of the telephone, computer, or other potentially distracting equipment, display or indicator within the vehicle.

According to still further optional features in the preferred embodiment of the invention described below, at least one of the sensors on the steering member also senses a physiological condition of the driver and disables the input/output devices when a predetermined physiological condition is sensed. For example, the physiological conditions sensed could be a predetermined gripping force applied by a hand of the driver while gripping the steering wheel, or a predetermined pulse rate, temperature, blood pressure, blood oxygen level, and/or skin conductivity of the driver. Such physiological conditions may indicate a stress condition of the driver and, when sensed, can lead to disabling or suppressing operation of the input/output devices to avoid aggravating the stressed condition.

The system may also sense a drowsiness condition of the vehicle operator. For example, the system may include a steering direction sensor that actuates a drowsiness alarm when sensing a failure to change the steering direction within a predetermined time, distance interval while accounting for vehicle speed in indicating a possible drowsiness condition in the driver. Additionally, such sensor when monitored with respect to changes over time will indicate jerk reaction, which indicates that the driver was not paying attention and the system will temporarily suspend all telematics to give the driver a chance to recover. Another application for such a sensor is the monitoring of an OFF Zero angle for an extended period of time/distance which can indicate a blind curve or hard curve, and again, here the system will temporarily suspend the telematics and/or input/output devices from interacting with the driver, and vice versa, until normal driving functions are restored.

According to another aspect of the present invention, there is provided a method of avoiding potentially dangerous conditions while operating a vehicle having an input/output device and a steering mechanism including a steering member to be manipulated by the driver, comprising: providing the steering member with two sensors for sensing the presence on the steering member of the two hands of the driver; and disabling the input/output device when the two sensors fail to sense the presence on the steering member of both hands of the driver while the vehicle is in motion.

According to further features in the described preferred embodiment, the input/output devices may also be disabled when the vehicle is traveling in the reverse direction, or is being braked, or is within a predetermined proximity of another vehicle, or is traveling at a high velocity, accelerating, decelerating, merging onto or exiting a freeway, passing, changing lanes, changing gears, depressing the clutch, or a driver is occupied using other accessories in the vehicle or otherwise distracted. Since a high degree of attention of the driver is required under all the foregoing conditions, operation of the vehicle telephone, for example, even the ringing signal of an incoming telephone call, could be highly distracting to the driver and is therefore disabled to avoid the possibility of increasing the risk of an accident.

To assure that the driver and the vehicle as well as on board communication devices as described above are working harmoniously together, one presently preferred embodiment of the system includes the following

The Driving Systems, (Man, Machine, Environment, Regulation, and History)

- Man: the driver, the passengers, the pedestrians, society;
- Machine: the car, the telematics, the infrastructure;
- Environment: the driving environment (in the car and outside the car and the infrastructure used)
- History: the personal driving experience, the equipment maintenance history
- Regulation: the existing laws and common safe driving etiquette into, society and the infrastructure regulation.

All of these elements will be harmonized by the system as it isolates the drivers from non driving related distractions and helps them comply with driving related laws and etiquette via reminders and passive assistance.

Further features and advantages of at least some of the embodiments or implementations of the invention will be apparent from the description below.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects, features and advantages of the present invention will be apparent from the following detailed description of the preferred embodiments and best mode, appended claims and accompanying drawings in which:

FIG. **1** schematically illustrates one form of a safety control system for vehicles constructed in accordance with the present invention;

FIG. **2** is an enlarged view illustrating the steering wheel in the vehicle of FIG. **1** and the sensors mounted thereon;

FIG. **3** is a block diagram illustrating the main components in the system of FIG. **1**;

FIG. **4** is a flowchart illustrating the operation of the system of FIG. **1**; and

FIG. **5**A is page **1** of a block diagram illustrating the nature and the flow of signals and algorithms used in one presently preferred embodiment of the system of the present invention; FIG. **5**B is page **2** of a block diagram illustrating the nature and the flow of signals and algorithms used in one presently preferred embodiment of the system of the present invention, hereinafter referred to as FIG. **5**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. **1** schematically illustrates a vehicle, generally designated **2**, equipped with a control system for sensing a variety of risk factors and potentially dangerous conditions and for automatically executing various responses when sensing such conditions in order to avoid hazardous situations tending to increase the possibility of an accident. One response is the disabling or suppression of one or more input or output devices to avoid interaction between the devices and the driver in certain situations and conditions. Another response includes providing a signal to or requiring the driver to take some action to increase driver alertness and/or awareness.

One example of a hazardous situation avoided by the control system illustrated in FIG. **1** is the use of the vehicle telephone in certain situations wherein a making of a telephone call by the vehicle driver, or the receiving of an incoming call, particularly the ringing of such a call, may distract the driver and increase the possibility of an accident when the driver is in a high-risk driving situation. Similar increased risk can result from the driver changing vehicle controls like temperature settings, or interacting (e.g. inputting or receiving output) with other telematics such as e-mail, radio, CD, DVD, navigation system, incoming page or the like. In such cases, the vehicle telephone, other telematics and/or other input/output devices are suppressed and no incoming or outgoing signals are allowed to distract the driver. In case the driver is the party initiating the telematics, a visual indicator and audio feedback can be activated to indicate to the driver that telematics is disabled, supply reason therefore, and even recommend driving modification to enable telematics. Another condition sensed by the system is undue stress in the driver, as indicated by the sensed pulse rate, temperature, blood pressure, skin conductivity (e.g. perspiration), loud voice(s) or stressful sounds in the cabin, such as baby crying, dog barking etc., any combination of one or more of which conditions would also disable incoming telematics. A further condition sensed by the system is the possibility of drowsiness on the part of the driver, in which case an audio alarm would be activated to alert the driver to this condition. Examples without limitation of other alarms to overcome driver drowsiness include vibration in the seat, changing HVAC temperature settings and blower speed to extremes, change of seat position, radio volume or station, CD-track etc. The system will restore operation of the input/output devices when conditions are normalized and will notify driver of all missed activities.

Vehicle **2** illustrated in FIG. **1** is a conventional vehicle including a steering mechanism, generally designated **3**, having a steering wheel **4**, a propulsion device such as a motor or engine **5** for driving the vehicle via a transmission or other torque converting means schematically indicated **6**, an acceleration pedal **7**, and a braking pedal **8** for controlling the vehicle. Vehicle **2** further includes one or more visual indicator and audio alarms **9**, e.g. mounted within the forward-look ahead viewing or hearing by the driver.

FIG. **1** further schematically illustrates a cellular telephone **10** within the vehicle, and a computer **11** or other multifunction telematic device allowing access to the Internet for transmitting and/or receiving faxes or e-mail, WAN and Web access, or other input/output device. Other input/output devices include vehicle fault/warning lights (battery, temperature, washer fluid, etc.) or other signal or alarm (open door, low fuel level, seat belt monitor, etc.). Vehicle **2** illustrated in FIG. **1** may also include many other components conventionally provided on vehicles at the present time or to be provided in the future.

The safety control system included in vehicle **2** illustrated in FIG. **1** includes a plurality of sensors for sensing various conditions with respect to the vehicle driver, the vehicle itself and/or the environment. These signals are collected via direct tapping to existing or added sensors or via vehicle bus and user specified values. These include sensors S**1** and S**2** applied to the steering wheel **4** of the vehicle; sensor S**3** applied to the steering mechanism **3** of the vehicle to sense changes in the steering direction and/or actuation of the turning indicator. The turning signal indicator switch/lever can also act as a blind spot collision avoidance actuator. When a driver actuates the turn signal indicator by moving the turning signal lever in advance of making a turn, subsequent momentary pull up or momentary push down on the lever will move the corresponding mirror further out to scan the vehicle blind spot.

Other sensors may include sensor S**4** sensing the condition of the gas pedal **7** and/or vehicle speed or acceleration; sensor S**5** sensing the condition of the braking pedal **8**; and sensor S**6** sensing the condition of the transmission or other type torque converter **6**.

Also schematically illustrated in FIG. **1** are sensors S**7** and S**8** carried to sense the proximity of the vehicle with respect to another vehicle; sensor S**9** sensing darkness or alternatively sensing the activation of the headlight; and sensor S**10** sensing weather conditions rain, sleet, snow, ice, temperature and/or sensing the activation of the front or rear wipers or headlight wipers.

As will be described more particularly below, the foregoing sensors (or signals) are generally effective only when the vehicle is moving to sense their respective conditions and to execute certain control functions in order to decrease the possibility of an accident. One important control function is to disable an incoming call from ringing the telephone **10**, and the computer or other telematics portable or built in **11** from accessing the Internet or announcing incoming signals, e.g. page, e-mail etc., and to indicate same by actuating a visual indicator and an audio feedback if a driver attempts to initiate telematics during an unsafe or a high risk condition, and may direct a driver to alternative driving habit to gain access to telematics. The system may also suppress delivery of unnecessary external signals such as certain vehicle warning lights or alarms, the system will restore function of the input/output devices when conditions are normalized and will notify driver

of all missed activities. In some cases, such as where a drowsiness condition is sensed, an audio alarm **9** is actuated. Other possible alarms to overcome driver drowsiness would include vibration in the seat, changing HVAC temperature settings and blower speed to extremes, etc.

FIG. **2** more particularly illustrates the sensors S**1**, S**2** mounted on the steering wheel **4**. As shown in FIG. **2**, the two sensors are mounted on or between the "two" and "ten" and the "three" and "nine" clock positions of the steering wheel **4**; the "two" and "ten" positions are considered to be the most preferred ones for the two hands of the driver in order to manipulate the steering wheel, but other positions could be employed, such as "nine and fifteen", which provide more clearance for activated airbags. The two sensors S**1**, S**2** thus sense the proper positioning of the two hands of the driver on the steering wheel **4**.

The two sensors S**1**, S**2**, which may be attached to or embedded in the steering wheel, may be simple electrical switches that are actuated by the respective hand of the driver when properly placed on the steering wheel.

Preferably, however, one or both of the sensors S**1**, S**2** or other sensors are also capable of sensing a physiological condition of the driver, such as the gripping force applied by the driver's hand, or the pulse rate, blood pressure, blood oxygen level, temperature and/or electrical skin conductivity of the driver's hand while gripping the steering wheel. For example, sensor S**1** could include a transducer for converting pressure to an electrical signal, such as a spring-type, carbon-type transducer, optical type or semiconductor type. Sensor S**2** could include one or more transducers, such as known in finger probes, for sensing pulse rate, temperature, and/or electrical skin conductivity, and for outputting an electrical signal corresponding to the magnitude of the sensed condition, as described for example in U.S. Pat. Nos. 6,319,205; 5,438,986; 5,065,749; 4,860,759; 6,415,176 or 5,897,505, the contents of which are incorporated herein by reference.

As will be described more particularly below, sensors S**1** and S**2** thus sense that both driver's hands are present on both sides of the steering wheel **4** to enable operation of the telephone **10** and the computer **11** or similar multi-function or standalone telematics or other devices. Thus, the telephone **10** can be permitting "hands free operation" or a telephone/telematics system that can be used as such with an adapter or when docked to the system gateway, as required by-many laws to avoid accidents, but also the driver is permitted to use the telephone only in a "hands free" manner, thereby precluding the driver from gripping a telephone to operate it even though the telephone or the telematics system may have a "hands free" capability. While the presently preferred implementation requires actuation of both sensors S**1** and S**2**, the system could be modified to permit use with only one sensor. This will permit use by drivers having only one hand. Requiring presence of at least one hand on the steering member **3** reduces the likelihood of unintended system activation such as may occur, for example, with voice activated systems that can be activated by any sound within a given range or frequency.

In addition, by providing sensor S**1** and/or sensor S**2** with the capability of sensing a physiological condition of the driver while gripping the steering wheel, other conditions can be sensed to disable the telephone for further reducing the possibility of an accident. For example, the gripping force applied by one or both hands of the driver may indicate a stress condition of the driver. A stressed condition may be also indicated by the sensed pulse rate, temperature and/or electrical skin conductivity (the latter indicating perspiration) of the driver. If a stress condition is sensed, the telephone **10** is disabled so as to decrease the possibility that the ringing noise of an incoming telephone call will so distract the stressed driver as to create a hazardous condition, or that the making of an outgoing call by the driver will be so distracting to the stressed driver as to create a hazardous condition. Whereas as a matter of standard all alarms are designed to attract attention, e.g. buzzers, ringers, flashing lights, etc., all of these alarms are muted by the gateway and the gateway will communicate all alarms and notification to the driver via driver selected method, e.g. visual, audio or both.

The provision of a grip sensor on the steering wheel also enables the system to sense drowsiness or dozing of the driver, as in U.S. Pat. No. 4,485,375, incorporated herein by reference. Thus, if the gripping force sensed by sensor S**1** and/or sensor S**2** drops while the vehicle is in motion, this could indicate a drowsiness condition. If such a condition is sensed, the audio alarm **9**, which may be a separate alarm or a radio volume control or hvac blower and temperature control, or alternatively a vibrator, may be activated, together with a visual indicator in an attempt to arouse the driver and to alert the driver to the drowsiness condition. When drowsiness is sensed, the telephone **10** would not be disabled since the ringing of an incoming call may be further effective to arouse the driver. Other alarms to overcome driver drowsiness would include vibration in the seat, changing HVAC temperature settings and/or blower speed to extremes, etc.

The sensors S**1** and S**2** are preferably located at the ten o'clock and two o'clock positions but may be alternatively located in other positions such as the nine o'clock and three o'clock positions. The mechanisms of the switch include, by way of examples without limitation, mechanical, optical or resistive sensors or switches, a jog dial or switch (e.g. of the type that can be rotated to scroll amongst choices and depressed to select a choice), slide switch and a rocker switch. The sensors can be arranged to be actuated either in the thumbs-up position or the thumbs-down position. The sensors are tested for integrity by the microprocessor **20** during start up and are designed to reduce the likelihood of accidental activation. Preferably, the integrity check determines if the switches can be activated and deactivated to ensure that the switches are not stuck in one state. The switches may become stuck unintentionally, or may be purposefully placed in the activated state to override the safety switches and permit actuation of the control system without having one or both hands present on the steering member. The detection of failed switches will cause the microprocessor to block operation of the system. Hence, the integrity check prevents a user from effectively overriding the safety switches to ensure that use of the control system occurs only when the drivers hand or hands are present on the steering member **3**.

Sensor S**3** is coupled to the steering mechanism **3** so as to sense changes in the steering direction. For example, an alert driver constantly makes minor changes in the steering direction automatically, but not so with respect to a drowsy or dozing driver. Accordingly, if sensor S**3** fails to sense a change in the steering direction within a predetermined time interval, this would indicate a possible drowsiness condition in the driver, and therefore the audio alarm **9** would be activated in an attempt to arouse the driver and alert him to that condition.

Sensor S**4** senses the depression of the gas pedal **7**, and/or vehicle speed or acceleration sensor S**5** senses the depression of the brake pedal **8**, and sensor S**6** senses the condition of the transmission **6** and/or also the velocity of the vehicle. For example, if the transmission is in reverse gear, the driver should not be distracted by receiving or making a telephone call, or by other devices or signals and therefore these things

should be disabled. If desired, the same could apply in any gear other than the normal drive gear. Also, if the vehicle is moving at a relatively high velocity, is rapidly accelerating a decelerating, is engaged in turning or otherwise rapidly maneuvering, such that any unnecessary distraction of the driver should be avoided, the devices and signals could likewise be disabled.

Sensor S**7** mounted at the front of the vehicle senses its proximity to a vehicle ahead of it; sensor S**8** mounted at the rear of the vehicle senses the proximity of a vehicle behind it; sensor S**9** senses the darkness level of the road on which the vehicle is traveling (e.g., whether day or night, whether the road is brightly illuminated); sensor S**10** senses a rain condition; and sensor S**11** senses whether either of the turn indicators of the vehicle is operating to signal for a turn or a change of lanes.

The conditions sensed by sensors S**7**-S**11** are also such that a hazard may be produced if, during the existence of such a condition, the full attention of the driver would be diverted by the ringing of the telephone or by the use of the telephone for making an outgoing call. Accordingly, under such conditions, the telephone **10** is disabled from operation. Similarly, the computer **11**, if present, is disabled from operation to preclude access to the Internet for transmitting and/or receiving faxes or e-mail, which could also result in a similar distraction increasing the possibility of causing an accident. And further, other devices, including telematic devices, vehicle signals or alarms, and the like can be suppressed or disabled to avoid or limit distractions to the driver under certain conditions.

FIG. **3** is a block diagram schematically illustrating a microprocessor, generally designated **20**, included in the vehicle safety control system of FIG. **1**, together with its inputs schematically indicated by blocks **21**-**33**, and the outputs schematically indicated by blocks **41**-**45**.

Thus, as shown in FIG. **3**, microprocessor **20** includes inputs **21** and **22** from the steering wheel sensors S**1**, S**2**, to indicate whether driver's hands are on the steering wheel. Microprocessor **20** further includes an input **23** indicating the gripping force applied by one or both of the hands to the sensors S**1**, S**2**, and an input **24**, also from one or both of the sensors S**1**, S**2**, indicating the heart pulse rate, skin conductivity, temperature, blood pressure, blood oxygen level, and/or other physiological condition of the driver having a bearing on proneness of the driver to accidents or instantaneous driver stress level or general physical well-being. As indicated earlier, these inputs indicate particularly whether the driver is in a stressed condition, drowsy, or in an alternate embodiment, when an optional breath alcohol sensor is activated. In addition to or in place of the sensors S**1** and S**2**, the physiological conditions can be monitored by other sensors mounted elsewhere in the vehicle including on other locations or the entire surface area of the steering wheel. These sensors may be actuated by direct contact with the driver, or by infra red (for example, to sense increased body temperature and the like), or camera (for example, to sense increased driver agitation, flushed facial appearance, by way of examples without limitation).

Another input into microprocessor **20** is from the steering direction sensor S**3**, as indicated by block **25**. This input is helpful in indicating the alertness of the driver, particularly whether the driver may be in a drowsy or even a dozing state, which would be indicated if this input shows no change in the steering direction within a predetermined period of time. The sensor S**3** can also determine rate of change of steering direction, and can provide information used to suppress driver distraction signals when the vehicle is turning sharply, negotiating a long curve that may be blind or of limited sight distance, or during a slalom maneuver.

Another input to the microprocessor would be from a sensor associated with the vehicle cup holder to indicate when a cup which was initially disposed in the holder has been removed, as for drinking. The sensor might include a weight indicator to determine whether the cup was empty when lifted or a temperature sensor to sense heated beverages. This sensor may also sense food on a food tray or elsewhere in the vehicle.

Further inputs into microprocessor **20** include signals from the gas pedal sensor S**4** to indicate high acceleration (block **26**); the braking pedal sensor S**5** to indicate braking (block **27**); the transmission sensor S**6** to indicate high vehicle speed or reverse drive (block **28**); the proximity sensors S**7**, S**8** at the opposite ends of the vehicle to indicate the proximity of the vehicle to other vehicles (block **29**); the darkness sensor S**9** (block **30**); the weather sensor S**10** (block **31**); and turn-indicator sensors S**11** (block **32**), and other sensors such as vehicle speed.

FIG. **3** illustrates a further input from navigation software (block **33**) with which the vehicle may be equipped in order to assist the driver in navigating the vehicle to various desired locations. For example, the navigation software could be pre-programmed to output a signal to microprocessor **20** at certain locations, such as at heavily-trafficked roads, intersections, bridges, tunnels, etc., where the full concentration of the driver is sufficiently critical to avoid distractions as may be caused by a telephone call or other communication to or initiated from the driver. The system could also provide an alarm to the driver indicating an approaching obstacle or condition that will require the driver's attention, including sharp turns, traffic-jams, intersections, bridges, tunnels, railroad crossings, school zones, traffic lights, construction zones, etc. Such locations could also be programmed by the driver by inputting a place mark when such an obstacle or condition is encountered as a reminder to the driver the next time that obstacle or condition is approaching or encountered. Place marks can be automatically applied by the system when certain threshold conditions are met, for example without limitation, unusual steering or swerving, hard braking or deceleration, and the like. Such place marks can be indicative of "near misses" and may represent areas or locations where the driver needs added caution. Any of the place marks can be incorporated or ignored by the driver as they are made, or at any time thereafter, according to the preferences or profile of the driver. The driver can also set as a preference what criteria the system uses for automatic place marks, or if such place marks are generated at all.

It will be appreciated that other sensors could be provided as inputs into microprocessor **20** wherein similar conditions may occur, either on the part of the driver, the vehicle, and/or the environment, in which, for purposes of safety, external distractions are to be avoided such as may be caused by making or receiving a telephone call, or being alerted by a vehicle signal or alarm, or by any other input/output device.

In the preferred embodiment of the invention, the microprocessor **20**, among other functions, acts as a "state machine" to define, arrange and prioritize features and functionalities of the system. In other applications this function can be performed by standalone which interconnects with a microprocessor **20**. The state machine aspect of the microprocessor may make telematic control decisions on a variety of criteria such as: (a) the frequency of use of the application, the frequency in which a number, e-mail or URL is contacted; (b) based on safety/urgency priorities, e.g. cruise or CD changer, cell messages or other telematics, or music played

on the radio; (c) as preset by the operator; (d) optionally, based on other collected information from the driving system, the microprocessor will initiate calls at predetermined times out of voice mail as, for example, when the driver completes backing out of a driveway and begins a trip. More frequently used applications can be placed higher in the order of applications than others so they can be more quickly and easily accessed, thereby reducing driver involvement in selecting and activating such applications. Further, active applications or most recently used applications can be placed higher in the order of applications so that they can be more quickly and easily accessed. And priority can be given to driving related features or controls over convenience or communication based controls. For example without limitation, if the vehicle cruise control system is active, the first application made available to the driver upon actuation of the control system is preferably the cruise control so that the driver can make any changes to the current cruise control settings, preferably by toggling through and selecting various options/features/settings with the safety switches on the steering wheel. Similarly, if an incoming telematic communication is announced by the system and the system determines it safe to inform driver of such communication, such communication is immediately available for the driver, even if such communication is normally low on the driver priority level.

The user provides signals to the state machine to block features or incoming telematics based on ID, location of phone numbers, e-mail addresses or URL. The blocked or stored telematics will be announced to the driver or stored for use in controlling the system in the future.

The state machine employs an assessment of the incoming calls and places them in categories such as: (a) likely and/or known to cause distraction and accidents; (b) likely but not known to cause distraction and accidents; (c) may cause distraction or accidents; (d) not likely and not known to cause distraction and accidents. These categories will be used to determine the effect of the incoming signals on the telematic system in accordance with the following Table 1:

TABLE 1

Device/Feature assessment.
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	Categories / Effect	Rank A	B	C	D
1	Likely AND/OR Known to cause distraction AND accidents	X	?	?	?
2	Likely BUT NOT Known to cause distraction AND accidents	?	X	?	?
3	May Cause distraction or accident	?	?	X	?
4	NOT Likely AND NOT Known to cause distraction AND Accident	?	?	?	X

Application usage Assessment
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01-clearly separating what's:	1a-Important for safe driving	Class A
	1a.-1Subject Vehicle	Class A-S
	1a.-2Other Vehicles	Class A-O
	1b-Important to drivers	Class B
	1c-"Nice to Have" for drivers	Class C
	1d-"Important/Nice to Have" for passengers	Class D

User interface requirement Assessment
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02-Assuring driver intent	Class A
03: Simplicity	Class A
04: Accessibility	Class A
05: High Availability	Class B
06: Universality	Class B

Self customization/individualization requirement Assessment

07: Portability	Class B
08: adaptive	Class A
09: Privacy	Class B

Owner requirement Assessment

10: cost	Class C
11: Interchangeability	Class A

Classification A B or C Need to be Addressed. D can be Totally Ignored.

The outputs from microprocessor **20** include control signals as shown by the following blocks: block **41**, effective to disable the telephone or other telematics from making outgoing calls; block **42**, effective to disable the telephone or other telematics from receiving incoming calls and from actuating the ringing signal; block **43**, effective to disable the computer, if provided, from accessing the Internet to make or receive e-mail, faxes, etc. or to disable any other signal to be otherwise communicated to the driver; block **44**, effective to actuate a visual indicator viewable by the driver; and block **45**, effective to actuate an audible alarm.

These blocks are representative of a wide range of outputs that may be utilized. For example, while block **41** is nominally listed as disabling outgoing telephone calls, the system may disable (via output **41** or some other output) all communications or input devices to prevent the driver from inputting or initiating activities or communications from them. In addition to disabling incoming telephone calls, output **42** or some other output can disable the output of any or all input/output devices to prevent communication to the driver of the particular output signals from these devices. Hence, the system may disable or suppress the output alarms or signals of a computer, PDA, pager, navigation system, and vehicle alarms or fault indicators (e.g. low fuel level, low washer fluid level, open door, unfastened seat belt indicators, etc). The outputs **44**,**45** nominally set forth as actuating visual or audible alarms, can also be used to actuate one or more mechanisms within the vehicle. For example, without limitation, the outputs **44**,**45** or other output(s) may be operable to move one or more rear view mirrors on the vehicle under certain conditions to change the field of view of the mirrors and aid the driver in maneuvering the vehicle, such as during a lane change at vehicle speed.

Outputs **44** and **45** can activate visual and/or audible alarms to draw the driver's attention to desired locations in the vehicle. This may be useful, for example, to draw the driver's attention to the rear-view mirror within the vehicle when a vehicle behind the driver's vehicle is sensed as being too close to the driver's vehicle for the relative speeds of the vehicles. Here, flashing a light or activating some other visible or audible alarm causing the driver to look in the rear-view mirror can aid the driver in avoiding a potential rear-end collision. Similar lights or alarms can be activated on or adjacent to the outside rear-view mirrors to draw the driver's attention to a particular side of the car. In this latter example, activation of a turn-signal indicating the driver is going to turn in one direction or switch lanes in that direction, may cause a visual alarm to be activated if a vehicle is sensed in sufficiently close proximity to the driver's vehicle in the generally intended direction of travel. In this scenario, the outside rear-view mirror may also be moved automatically by the system to change the field of vision the driver has through that mirror and thereby locate any vehicles in the "blind spot" of that mirror prior to its adjustment.

Additionally, the visual, audible, tactile or other alarms may be activated to increase the driver's attention and/or alertness during certain situations. A drowsy driver may be aroused or have his road alertness increased by flashing or otherwise illuminated or activated (e.g. audible or tactile) alarms. One widely available audible alarm includes the vehicle radio wherein the system can change the volume of the radio to arouse a drowsy driver. A driver engaged in a lengthy telephone conversation, or a lengthy internet usage session, or other lengthy communication session, may become overly focused on the communication and less focused on driving. In such situations, at least some people become focused straight forward, and lack awareness of the peripheral environment, exhibiting so-called "tunnel vision." Activating visual or audible alarms can cause the driver to look away from straight ahead and thereby increase the driver's awareness of the surrounding environment. The output signals may interrupt or override conflicting signals (e.g. audible signals may override the radio) unless the conflicting signals are safety related, or doing so is likely to increase driver distraction. The output signals are preferably adjusted automatically to overcome existing environmental conditions. For example, audible output signals may be louder if the noise level detected within the vehicle is high (e.g. wind noise from a window rolled down), and visual signals may be adjusted in intensity to better accommodate night or daytime viewing.

Operation

FIG. **4** is a flowchart illustrating an example of the operation of the system of FIGS. **1-3**.

Thus, as shown in FIG. **4**, the control system is made operational when the vehicle is in motion (blocks **50**, **51**). When the vehicle is in motion, a microprocessor **20** outputs signals **41**, **42** and **43** (FIG. **3**) disabling the vehicle telephone, computer, etc. within the vehicle (block **53**), and also signal **44** actuating a visual indicator within the vehicle to indicate this condition (block **54**).

If, on the other hand, both hands of the driver are properly sensed on the steering wheel **4** so as to actuate the two sensors S**1**, S**2**, one or both of the sensors is used to sense a physiological condition of the driver that might indicate a stress condition (block **55**). For example, such a stress condition could be indicated by an unduly high gripping force applied by one or both of the hands of the driver to the steering wheel, or by an unduly high pulse rate of the driver or skin conductivity of the driver indicating a high degree of perspiration. If such a stress condition is indicated as being present, the telephone, computer, vehicle alarm or signal, etc. are also disabled (block **53**), and a visual indicator activated (block **54**) to indicate this condition.

Next, the system checks to determine the condition of the vehicle, e.g. whether the vehicle: is traveling in reverse, as indicated by sensor S**6** (block **56**); is being braked, as indicated by sensor S**5** (block **57**); is traveling at or over a predetermined high velocity or high acceleration, as indicated by sensor S**6** (block **58**); is executing a curve or turn, as indicated by steering mechanism sensor S**3** (block **59**); is about to execute a turn, as indicated by turn indicator sensor S**11** (block **60**); or is traveling in the dark or in the rain, as indicated by sensor S**9** or sensor S**10** (block **61**). If any of these conditions is sensed, the telephone and the Internet access by the computer are also disabled (block **53**), and a visual indicator is actuated to indicate this condition (block **54**).

As further shown in FIG. **4**, if while the vehicle is in motion no change in steering direction has been sensed within a predetermined time interval (block **62**), an audible, visual or other alarm or vibrator is also activated (block **63**) to alert the driver to a possible drowsiness or dozing condition. Other alarms to overcome driver drowsiness would include vibration in the seat, changing HVAC temperature settings and/or blower speed to extremes, etc.

If desired, a manual override switch can be provided to enable the driver to manually override any of these controls, preferably except for the control of block **52** assuring that both hands of the driver are properly received on the steering wheel.

Setup Scenario:

Driver set up a portable Telematic device such as a cell phone, blackberry, PDA, etc. with driver preferences:

(1) Control preferences, e.g. Hands always Vs Hands on for Telematics only, and/or both hands required on sensors S**1**, S**2** for duration of telematics usage, or both hands needed to initiate telematics, and only one hand required on one of S**1** and S**2** to continue use of telematics,

(2) Annoyance items: Baby crying, Dog barking, smokers in car etc.

(3) Telematics option: Preferred application to use, preferred priority system etc.

(4) Emergency and identifying information.

(5) A driver enters a vehicle

a. docks all electronic communication equipment, e.g. pager, cell phone, PDA, etc., to the control system wirelessly or physically, thus identifies him/herself to the vehicle

b. System mutes all Telematics but keeps them active

c. Driver initiates his/her trip.

Scenario One (Driver Initiated)

The driver wants to make a call, review pages, read e-mail, connect to the Internet, use navigation system, etc. (1) The driver will activate the safety switches by placing both hands on the designated areas of the steering wheel and then, after the system acknowledges safety switch activation by providing the driver with a beep or voice or visual feedback, the driver with his/her hand on the actuated safety switch will toggle through options with the toggle switch until he gets to a selection that is needed, then using the toggle switch will confirm selection and proceed with the desired action. This could be multiple layers of options and applications, and can be accomplished with one or both of the toggle switches as desired by the driver. The toggle switches preferably can be activated with the thumbs of the driver permitting the hands to remain on the steering wheel. The actuation of the toggle switches can be simplified by a common scheme known as thumb gesture interpretation where a thumbs up (usually indicated by moving a switch upwardly with the thumb or moving the thumb upwardly relative to a switch or sensor) means yes and a thumbs down (usually indicated by moving a switch downwardly with the thumb or moving the thumb downwardly relative to a switch or sensor) means no, such as pushing one or both of the toggle switches upwardly to accept a setting or available option, and pushing one or both toggle switches downwardly to reject a setting or available option. The options can be provided on a HUD or via voice. Even if devices can be activated by voice control, they still need to have the safety switch or switches depressed to ensure driver intention and not an erroneous sound from the radio or a passenger or a malfunction of devices.

During this time the driver's hands must remain at the 10 and 2 position (also called 10:10). The driver must maintain the steering wheel within a specific angle which is calculated based on the following inputs: (1) weather condition, (2) speed of vehicle, (3) proximity of vehicle to others (front/back), feedback from ABS, ESP, traction control, etc. This angle (for example) is about 30 degrees either side of zero if the speed is 40 mph, but it is less when the speed is higher and more when the speed is lower. The driver will also be allowed to temporarily take his hands off the 10:10 position to, for example, make a sharp turn but will have to put them back at 10:10 to continue the previous activity. This amount of time is again dependent on speed, weather, vehicle proximity to others and feedback from ABS, ESP and traction control. In addition to use of a telephone or other telematic device, the switches on the steering member **3** can also be used to control the radio, CD player, cruise control, and environmental settings in the vehicle such as the interior temperature, and blower and heat/AC settings. The switches can be further used to initiate an emergency phone call. In one implementation, an emergency phone call (e.g. dialing 911) can be placed by pushing both toggle buttons in one direction, such as upwardly, and holding them for a period of time. The emergency phone call may activate the phone, or may automatically send by e-mail, voice data or other method information relating to the vehicle position, any airbag deployment, fire or smoke in the vehicle, number of passengers, presence of dogs or other notable things, recent vehicle operational characteristics, and the like. A call to another phone number can be placed by pressing both toggle switches in the other direction and holding them for a desired time.

Scenario Two (Incoming)

Incoming information will be customized by the driver, in accordance with Table A, to select what he/she wants to receive and in what priority. Once incoming information is detected by the system, the system will go through a checklist to verify feedback from steering about position and about speed and ABS and ESP and traction control and weather condition. When all conditions are met, the system will announce the incoming information to the driver who will have to press the safety control switch and accept the communication by holding the toggle buttons momentarily up. While using the toggle switch to accept the incoming information, the remainder of the controls will be as per outgoing, including hands at 10:10.

It will thus be seen that the illustrated system is effective to disable the operation of the telephone, telematic, or other input/output device (and/or access to the Internet by a computer) within the vehicle when any of the above-described conditions is sensed, to thereby avoid a distraction which may cause accidents. The fact that both hands of the driver must be present on the steering wheel in order to enable the operation of the telephone (and/or computer, telematic or other devices) not only requires that the vehicle must be equipped with a "hands free" capability, but that the driver must actually use this "hands free" capability created by the system gateway in order to make or receive telephone calls or other telematics activities. In addition, other sensors could also be provided to disable a vehicle telephone or a multi-function telematics system or Internet access provided by a vehicle computer in response to other conditions, such as the detection within the vehicle of the sounds of an emergency siren in an approaching vehicle, a child crying within the vehicle, the driver handling of a drink or food item from a monitored cup holder or a monitored food tray, or the activities such as modifying the cabin temperature, changing the volume on the radio, extending the sun visor etc.

The monitoring of all such signals, sensors, data and conditions is done by a modular dynamic plug and play state machine that integrates, prioritizes, enables, blocks or mutes telematics application and telematics functionalities based on priorities determined by learning frequency and characteristics of use or by driver preset preferences.

Such machine may be a hardware based, a software embedded in a dedicated hardware or a software/protocol embedded in one or more telematic equipment and it may act as a node on a network of telematic equipment and the vehicle bus, or as a hub for all telematics and a gateway to the vehicle, or any combination of the above.

The state machine can allow driver to set their preferences on a portable telematics device such as a cellular phone, or a WAN, Web site or via a FTP and e-mail. Such set up can be transferred to the vehicle in use when the driver docks the cell

phone or other portable telematics devices to the system gateway. The downloaded profile will be updated with driving skills, driver habits and geographical/time/date based notes added by the driver while driving. The updated profile will be uploaded back to the source when the vehicle comes to a final stop, or ongoing as driving is being carried out. Such data may be direct values and status or a statistical representation of a driving experience. Therefore, the driver profile, preferences, history and other relevant data can be transferred to other vehicles by subsequent use of the source within another vehicle. In this manner, the driver's information can be coupled with data particular to the subsequently used vehicle to create another matrix of condition and factor parameters monitored and controlled in use of the vehicle. The information may be stored in any suitable form on any suitable device including on a telematic device (e.g. telephone, PDA, computer, and the like), on a disc, CD, magnetic drive or the like, on a portable digital storage device like those used with digital devices (e.g. compactflash cards, memory sticks, flash drives and the like). The information may also be transmitted to another source, for example, to an internet web space from where it can be later accessed and used as needed. Vehicle data or information may also be stored either on or in the same source as the driver information, or separately. The vehicle data may stay within the vehicle, or may be transmitted to another location. For example, certain vehicle data may be sent to the vehicle manufacturer or other source to provide information on the performance of the vehicle, consumer use habits, service history, and the like. It should be easy to control access to information stored or generated by the system without the need for a second party. Also, no real time data access is possible to second party without explicit/implicit authorization or high level of sophisticated technology. This protects a drivers profile and other information, including at least the emergency contact information and the like.

The preferences included by the driver will range from telematics management options, e.g. preset priorities or automatic based on learning by frequency of use, tags of time, location and physiology. Preset priorities will allow a driver to assign sequence of access to telematics and telematics functionalities or to block certain activities based on time of day or source of telematics or geography at will. Automatic based learning condition, on the other hand, for example, if the driver physiology shows stress during a telephone conversation with a certain number, such number will be tagged and will be treated as a source of high risk and will be blocked during unusually risky conditions so a driver does not engage in additional cognitive hungry activities. Additionally, if a driver uses telematics device A more often the C which is used more often then B, the access to such devices will be based on the mostly used first. In this case, A is followed by C and C is followed by B. Similar frequency based access priorities are applied to function of such telematics and also prioritized based on time, geography etc.

Other preferences set by the driver can include emergency contacts, medical record summary or identification, etc. to be used along with telemetry data when automatically reporting an accident via text to speech and via e-mail. This will help emergency dispatch understand and prepare the correct type of help needed, e.g. number of passengers, fire in cabin, impact speed, driver physiology and the driving telemetry before and during the impact. The trigger for an accident occurred reporting is preferably by one or more of the following signals: Distance and/or time from speed to zero is smaller than expected (taking into account weather, service monitor, vehicle capabilities, etc.), G-force too high for normal maneuvers, staling after hard breaking, airbag deployment, rollover indication, fire/smoke detected in vehicle.

The decisions to block, enable etc are accomplished by algorithms that share the hosts of signals provided to monitor for specific conditions that are encountered. These algorithms also update the driver profile to include skills and habits for further relaxing or restricting telematics. For example, a driver that drives frequently on expressways and in close proximity to other vehicles will be allowed more leeway then a person that hardly drives on the expressway. Similar monitoring occurs for nighttime driving, adverse weather driving and so on.

In one preferred implementation, as shown in FIG. **5**, the system monitors and analyzes a plurality of factors that can affect the safe travel of the vehicle, either alone or in combination with one or more other factors. Such factors relate generally to the vehicle, the driver, and the environment. The driver has various communication factors, physiological factors, and preferences/habits, skills and historical factors. The vehicle has instantaneous operational factors, and base and historical factors both associated and independent of a driver. The environment includes the interior vehicle environment, the exterior environment, geographic location, and regulatory factors.

Representative examples of driver communications factors include signals and information communicated to the driver such as vehicle warning indicators like low windshield washer fluid, low battery voltage, engine temperature, oil pressure, seat belt usage monitors, and the like. And further examples include input and output features of various devices communicated with the driver such as telephones, pagers, PDA's, computers, fax machines, GPS devices, navigation systems and displays, radios, CD players, CB's, video monitors, and other telematic or informational devices. These devices can be termed communications devices since they permit or provide one-way or two-way communication with a driver of some information or signal. The devices can also be considered input/output devices since some permit or accept driver input and some permit or provide output to the driver. The term input/output devices is not intended to limit application to only devices having both an input and an output, any device permitting or providing either an input or an output, or both, may be used.

Representative examples of driver physiological factors have already been set forth, and include skin conductivity, pulse rate, blood pressure, blood oxygen level, grip pressure, alcohol sensed on driver's breath body temperature and the like. Other examples of driver physiological factors include driver seat position, seat belt usage, seat belt position (used in part to determine if driver is fully seated or leaning forward, etc), and driver position within the seat, driver seat reclining position and the steering member position such as tilt/telescoping adjustment. Drivers also have base and/or historical factors such as driver experience indicators (e.g. normal driving patterns, preferences, skill level, relevant training and safety record),

Representative examples of factors relating to the vehicle and its operation include whether the vehicle is in reverse, in park, accelerating, decelerating, traveling at high speed, negotiating a turn, swerving, making an extended length turn, turning at relatively high velocity, traveling without direction correction (one possible indication of a drowsy driver as noted previously), whether there is fire or smoke in the vehicle, and whether the engine has stalled (as may be indicated by movement of the vehicle without continuing engine operation), tire pressure, whether the vehicle has rolled-over or been inverted, is climbing or descending a hill, if the

airbags have deployed, and if the ABS, traction control, or stability systems have been activated. Base or historical vehicle factors include whether the vehicle has driver assistance systems like ABS, adaptive cruise control, traction control, ESP/stability or other electronic steering assist, four-wheel drive, all-wheel drive and the like, as well as historical data indicative of service condition, tire wear, brake wear, and habits/skills of the driver within said vehicle, driving application (e.g. recognizing difference in usage between a family sedan and a police cruiser), minimum braking distance, maintenance history.

Representative examples of environmental factors include exterior conditions such as weather (rain, snow, bright sunshine, etc), time of day (e.g. night or day), road conditions (e.g. wet, icy, etc), proximity to other vehicles, proximity to known obstacles, and the like. Further representative examples of environmental factors preferably also include interior conditions such as loud noises like a crying baby or barking dog, and the presence of cigarette smoke in the vehicle which can be an irritant to at least some drivers.

Representative examples of regulatory factors include speed limits, traffic signals, and specified rules for certain roads and the like.

The factors are monitored and compared to set or determined thresholds to determine the level of driver attention required to safely control the vehicle. The system controls all machine to man communications (e.g. phone, vehicle alarms/indicators, computer, PDA, etc) to and from the driver as a function of the monitored factors that provide an indication of the level of attention required by the driver to safely operate and control the vehicle. Conditions and factors that require a higher level of driver attention cause the system to permit less or no communication to and from the driver. This reduces driver distraction and frees the driver's senses so that they may be employed to ensure safe vehicle operation. The factors and conditions are assessed, rated and/or compared to threshold values. A single factor over a threshold value may be sufficient to cause the system to restrict, suppress or disable communications to and from the driver. Also, several factors, even if no single factor is over its threshold value, can cause the system to restrict communications to and from the driver. In other words, the relative severity of a combination of individual conditions encountered by the driver can cause an aggregate value over a threshold wherein further driver distraction is not desirable, so the system prevents communications to and from the driver in such situations. For example, the presence of water on the driving surface may not by itself be enough to cause the computer to restrict communications to and from the driver, but wet roads in combination with another condition like unusual driver physiological symptoms indicating increased driver stress, may be enough to cause the system to restrict or prevent communications with the driver. In this manner, the factors and conditions signals can be considered to be rated or valued with the ratings and values weighted and combined, or otherwise statistically rendered to provide an overall assessment of the driving conditions. Further, certain of the factors can be made dependent on other factors. For example, without limitation, the presence of water or ice on the road may be used to alter the threshold value or level relating to proximity to other vehicles since an increased stopping distance may be required when driving in such road conditions. Such diminished road conditions can also lower the acceptable speed or acceleration parameters.

Certain of the thresholds may be set or predetermined prior to installation of the system, and other thresholds may be learned or determined through use of the system in accordance with driver experience, history, preferences, as well as

vehicle features, information and history. For example, one vehicle may be able to stop faster than another, so the threshold for the proximity to other vehicles can be different between the vehicles as the one vehicle can travel closer to other vehicles and safely stop in an emergency. Likewise, a driver that frequently travels on expressways at relatively high speeds in relatively close proximity to other vehicles may be permitted more leeway for communications in such conditions than a driver that rarely or never travels in that manner. Likewise, a driver that frequents a certain geographic region may be given more leeway for communications in that region than a driver outside of his normal driving region since that driver may be distracted trying to navigate in unknown regions. Likewise, drivers in vehicles with ABS, or other advanced safety features may be permitted greater leeway in communications that drivers in vehicles without such features in situations and conditions where these features improve the vehicle response and safety. Accordingly, the thresholds for individual driving factors and conditions, or combinations of factors and conditions, can be customized based on the driver and the vehicle. If desired, the driver profile can be continually updated based on feedback obtained as to the driver's driving habits, and such profile updates can be made based on real-time data, or statistical analysis.

Additionally, the various communications or inputs/outputs to and from the devices in the vehicle may detract differently from the driver's attention and ability to safely control the vehicle. Making a phone call may involve searching a database of names and phone numbers, dialing numbers, using voice activation or other tasks, and may be more driver intensive than answering a phone call of being alerted of a vehicle fault (like low washer fluid, low fuel level, etc). The level of driver involvement and/or potential distraction from the various communications devices, both when initiated by the driver and when communicated to the driver (where appropriate), is another factor that can be assessed to determine the level and timing of any restriction of the driver communications. So under at least some conditions certain communications to and from the driver may be restricted or suppressed while others are permitted.

When the assessed risk to the driver and other vehicles and things, is borderline (i.e. higher than normal risk, but not severe), the system may provide recommendations to the driver as to how to overcome any communications restriction, if doing so will not cause undue driver distraction. For example, without limitation, if the vehicle is traveling too fast to safely receive an incoming or make an outgoing telephone call, the system may inform the driver (either audibly or visually) to slow down to enable the telephone. Hence, the driver is permitted access to the communications if corrective action is taken (avoiding swerving, slowing down, driving within speed limit, increasing distance between adjacent vehicles, etc). Similarly, a time-delay may be initiated after certain conditions are sensed, like unusually rapid braking, or swerving, or the like to prevent immediate inputs to or outputs from the device as soon as the vehicle and driver factors are within allowable limits. This time-delay permits the driver to regain composure and assess the current situation prior to use of or interruption from the various input/output devices.

The system preferably permits significant customization by the driver. The driver can preferably select the type of feedback provided by the system (audible, visual, tactile, etc), and when the feedback is provided (e.g. not during telephone calls, etc). The driver can also preferably customize the voice used in any voice feedback, or the tones, tactile response, or visual display, if any. This customization helps to reduce distraction or annoyance caused to the driver by the system

feedback, and thereby helps to maintain driver concentration and awareness of the vehicle and the environment.

The system preferably also provides a cross-check of at least some sensed conditions, such as vehicle operational conditions, to ensure that individually but related conditions are in agreement. For example, the system may compare sensed RPM or engine rotational speed with the throttle or velocity sensor and transmission sensor to ensure the sensed vehicle operating characteristics are all in agreement. If they are not, it could indicate a vehicle fault (e.g. slippage of the transmission or the tires on the road) and the system applies a more stringent restriction of the input/output devices as appropriate. The control system can be disabled by the user, but preferably, to do so requires the user to activate some signal viewable by others that indicates the vehicle is operating out of normal constraints. One readily available mechanism that satisfies the above is the emergency or hazard lights provided on most vehicles and operable to cause several exterior lights to repeatedly flash indicating vehicle distress. Accordingly, in some implementations, the control system may be overridden by activating the vehicle emergency lights.

The system preferably includes a learning mode wherein certain routine or unusual events, conditions, locations, phone numbers and the like are stored for later access. In the learning mode the microprocessor or other controller may accept an input from a driver to store an address of a particular location, or may inquire if the driver wants the address stored wherein the driver may respond no or yes by activating the toggle switches on the steering member. The address can be stored as a function of its geographic location (latitude/longitude) for later access to, for example, facilitate finding that location at a later date, perhaps with the assistance of a navigation system. The learning mode could also be used to call out other features the driver may want to be reminded or warned of in the future, such as school zones, railroad crossings, changing speed limits, etc. The system could prompt or notify the driver when the vehicle is approaching such stored features as a function of the vehicle heading and geographic location. The learning mode provides increased customization ability to the driver, and can help build the driver's profile/driving habits and characteristics. The learning mode can be activated and deactivated by the driver, and may be preset for automatic use upon initial use of the system and for a certain time thereafter, subject to the ability of the driver to manually override such setting.

The system preferably also has a training mode wherein the system provides increased assistance to a driver to familiarize the driver with usage and various characteristics and features of the system. In training mode, the system may assist driver selection of applications by instructing or notifying the driver of the manner by which applications can be selected, as well as choices within an application. Training mode may also provide increased feedback of the reasons for suppression of any input/output device, and perhaps, ways to avoid such suppression (reduce vehicle speed, avoid harsh accelerations, etc). The training mode can be activated and deactivated by the driver, and may be preset for automatic use upon initial use of the system and for a certain time thereafter, subject to the ability of the driver to manually override such setting.

Predictive algorithms can be used to determine certain driving conditions based on driver habits and history, as well as data from research, or other drivers and the like. For example, the vehicle may perform certain maneuvers prior to exiting from a freeway to an off-ramp, or entering a freeway from an on-ramp. The vehicle may decelerate and gradually turn onto an off-ramp, and then further decelerate and negotiate a sharp turn on the off-ramp, or preform some other maneuvers from which the system can predict that the driver is exiting a freeway. From this prediction, the system may increase the restriction of telematics or other communications with the driver. Similar predictive behaviors or maneuvers may be detected for entering a freeway, and the system may likewise increase restrictions of communications.

Therefore, in at least one presently preferred embodiment of the safety control system for vehicles, the system includes a communication device having at least one of an input accessible from within the vehicle and an output communicated within the vehicle, at least one sensor operable to sense at least one condition related to vehicle operation, and a controller communicated with the sensor and the communication device to selectively suppress at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold. The communication device can be at least any of those previously mentioned herein, for example without limitation, a telephone, PDA, computer, vehicle alarm or indicator, navigation system, DVD player/recorder, CD player/recorder, and other electronic and/or telematic or other input/output devices accessible by the driver, and/or providing information or some communication to the driver. The sensors can also be at least any of those previously mentioned herein, for example without limitation, the physiological sensors, safety switches, toggle switches, vehicle operational sensors (e.g. steering, acceleration, deceleration, etc). And the controller can be at least any of those previously mentioned, for example without limitation, a stand alone unit with built-in microprocessor, an existing vehicle processor or control unit, and the like, and can be arranged to communicate with the driver and/or other devices as set forth herein.

While it will be appreciated, therefore, that while the invention has been described with respect to one preferred embodiment, many other variations, modifications and applications of the invention may be made. For example, without limitation, while the preferred embodiment requires the driver to maintain both hands on the steering wheel to initiate, receive and maintain communications or system access, other schemes may be used. For example, the system may require presence of two hands on the steering wheel to initially activate the system, and perhaps provide initial input (e.g. to place a telephone call and the like), but after such activation or initial input, the system may permit one hand to be removed from the steering wheel. This would facilitate, among other things, shifting a manual transmission. Shifting a manual transmission can be accommodated in the scheme requiring both hands on the steering wheel by permitting one hand to leave the steering wheel when the clutch is sensed as being activated to shift gears. Of course, other modifications, substitutions and applications can be accomplished in view of this disclosure.

The invention claimed is:

1. A method for controlling a telematic device in a vehicle operated by a driver, the telematic device having at least one of an input accessible from within the vehicle and at least one output communicated within the vehicle, the output having an original format and a format different than the original format, the method comprising:

sensing movement of the telematic device;

comparing movement of the telematic device to a threshold;

preventing said at least one output from being communicated within the vehicle in the original format of said at least one output when movement of the telematic device is at or above the threshold;

providing said at least one output to the driver in the format different than the original format when movement of the telematic device is at or above the threshold; and

permitting the driver to access said input or providing said output to said driver in the original format when movement of the telematic device is below the threshold.

2. The method of claim **1** wherein further including the step of preventing an attempted input or output in response to a sensed parameter of said at least one condition being outside of a threshold and operable to permit access to a said input or communication of a said output from the telematic device after said sensed condition that caused prevention of the attempted input or output is again sensed to be within the threshold.

3. The method of claim **2** further comprising the step of delaying access to a prevented input or communication of a prevented output from the telematic device for a predetermined period after the movement of the telematics device is below the threshold limit.

4. The method of claim **2** further comprising the step of enabling an output detectable by the driver of the vehicle, and said output provides information to the driver as to a driving modification that can be made to re-enable the suppressed input or output.

5. The method of claim **1** further comprising the step of creating a database of information based on a specific driver.

6. The method of claim **1** further comprising the step of denying the driver access to the input screen when the movement of the telematics device is above a threshold.

7. The method of claim **1** further including the step of adjusting the vehicle features based on the specific driver.

8. The method of claim **1** wherein the cell phone has at least one audible tone and wherein the method further comprises

preventing said audible tone from being provided to the driver when the speed of cell phone is at or above the threshold and

permitting the driver to access said audible tone when the speed of the cell phone is below the threshold.

9. The method of claim **1** further including the step of providing a signal that is detectable outside of the vehicle that the movement of the telematics device is at or above of a threshold.

10. The method of claim **1** further including the step of providing the driver a signal that a the movement of the telematics device is at or above of a threshold.

11. The method of claim **1** further including the step of allowing the output to be provided to the driver in the original format if the telematic device is receiving a signal from an approved source or is an approved application.

12. The method of claim **1** further comprising the step of having visually accessible information changed to verbal announcements.

13. The method of claim **1** further comprising the step of having an incoming text based message read.

14. The method of claim **1** wherein the step of providing said at least one output to the driver in a different format comprises selecting at least one from the group consisting of changing the volume, changing the sound effect, changing the tactile feedback, muting the telematic device, converting text to speech, blocking video output but permitting audio output, and replacing video output with a different display.

15. The method of claim **1** wherein the step of providing said at least one output to the driver in a different format comprises converting text display to graphical or iconic presentation.

16. The method of claim **1** wherein the step of permitting the driver to access said input or providing said output to said driver only when the movement of the telematics device is below the threshold is delayed for a period of time.

17. The method of claim **1** wherein the step of permitting the driver to access said input or providing said output to said driver in the original format when movement of the telematic device is below the threshold comprises a driver initiated action.

18. The method of claim **1** further comprising the step of adjusting the threshold as a function of a signal received by the telematic device.

19. The method of claim **1** further comprising the step of transmitting data remotely.

20. The method of claim **1** further comprising the step of downloading data, software, operating system or add new application.

21. The method of claim **1** further comprising the step of making data available to a remote party.

22. A method for controlling a cell phone in a vehicle operated by a driver, the cell phone having at least one display screen, the display screen having an original format and a format different than the original format, the method comprising:

determining the movement of the cell phone or the vehicle;

comparing the movement of the cell phone or the vehicle to a threshold;

changing said display screen to the format different than the original format when the movement of cell phone or vehicle is at or above the threshold; and

changing said display screen to the original format when the movement of the cell phone or vehicle is below the threshold.

23. The method of claim **22** further comprising the step of creating a database of information based on a specific driver.

24. The method of claim **22** further comprising the step of transmitting data related to vehicle operation remotely.

25. The method of claim **22** further comprising the step of adjusting the threshold as a function of a signal received by the telematic device.

26. The method of claim **22** wherein the cell phone has at least one audible tone and wherein the method further comprises

preventing said audible tone from being provided to the driver when the speed of cell phone is at or above the threshold and

permitting the driver to access said audible tone when the speed of the cell phone is below the threshold.

27. A method for controlling a cell phone in a vehicle operated by a driver, the cell phone having at least one audible tone and at least one display screen, the output having an original format and a different format, the method comprising:

determining the speed of the cell phone;

determining whether the speed of the cell phone is within a threshold;

preventing said audible tone from being provided to the driver when the speed of cell phone is above the threshold;

providing said display screen to the driver in the different format when the speed of cell phone is above the threshold; and

providing said audible tone and display screen to said driver when the speed of the cell phone is within the threshold.

28. The method of claim **27** further comprising the step of creating a database of information based on a specific driver.

29. The method of claim **27** further comprising the step of transmitting data related to vehicle operation remotely.

30. The method of claim **27** further comprising the step of adjusting the threshold as a function of a signal received by the cell phone.

31. A method for controlling a telematic device in a vehicle operated by a driver, the telematic device having at least one of an input interface accessible from within the vehicle, the input interface having an original input interface and an alternative input interface different than the original input interface, the method comprising:

determining movement of the telematic device or vehicle;

comparing the movement of the telematic device to a threshold;

changing said input interface to the alternative input interface when the movement of the telematic device or vehicle is at or above the threshold; and

changing said input interface to the original input interface when the movement of the telematic device or vehicle is below the threshold.

* * * * *

Trials@uspto.gov
571-272-7822

Paper 25
Date: May 15, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORD MOTOR COMPANY,
Petitioner,

v.

SAFE DRIVING TECHNOLOGIES LLC,
Patent Owner.

IPR2022-00086
Patent 8,301,108 B2

Before SCOTT C. MOORE, PAUL J. KORNICZKY, and
BRENT M. DOUGAL, *Administrative Patent Judges.*

KORNICZKY, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Granting Petitioner's Motion to Strike
35 U.S.C. § 318(a); 37 C.F.R. § 42.64

I. INTRODUCTION

Ford Motor Company ("Petitioner") filed a Petition for *inter partes* review of claims 1, 2, 6, 11–14, 18–20, 23, 24, 43, 44, 47, 63, 79, 97, 99, and 113 of U.S. Patent No. 8,301,108 B2 (Ex. 1001, "the '108 patent"). Paper 2 ("Pet."). After institution, Patent Owner filed a Response (Paper 11 ("PO Resp.")), to which Petitioner filed a Reply (Paper 13 ("Reply")), to which Patent Owner filed a Sur-Reply (Paper 17 ("Sur-Reply")). A final hearing was held on March 22, 2023, at which the parties presented oral argument in support of their positions in this case. Paper 24 ("Tr.").

Petitioner bears the burden of persuasion to prove unpatentability, by a preponderance of the evidence, of the claims challenged in the Petition. 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d) (2019). After considering the parties' arguments and supporting evidence, we conclude that Petitioner has met its burden to prove claims 1, 2, 6, 11–14, 18–20, 23, 24, 43, 44, 47, 63, 79, 97, 99, and 113 are unpatentable over the asserted prior art.

Petitioner also filed a Motion to Strike Portions Patent Owner's Sur-Reply. Paper 19 ("Motion" or "Mot."). For reasons discussed herein, the Motion is *granted*.

II. BACKGROUND

A. Related Proceedings

As required by 37 C.F.R. § 42.8(b)(2), Petitioner and Patent Owner identify the judicial or administrative matters that would affect or be affected by a decision in this proceeding. Petitioner and Patent Owner state the '108 patent and related U.S. Patents 9,047,170; 9,713,994; and 10,532,709 are the subject of *Safe Driving Technologies LLC v. Ford Motor Company*, 1-21-cv-00064 (D. Del.) ("the Delaware district court litigation"). Pet. xii; Paper 3, 1.

They also state the latter three patents are the subject of the following *inter partes* reviews:

U.S. Patent 9,713,994	IPR2021-01341
U.S. Patent 10,532,709	IPR2021-01353
U.S. Patent 9,047,170	IPR2021-01446

Paper 3, 1; Paper 8, 2–3. The Delaware district court stayed the litigation pending the Board's decision in these four *inter partes* reviews. Ex. 1043, 2; Paper 8, 1.

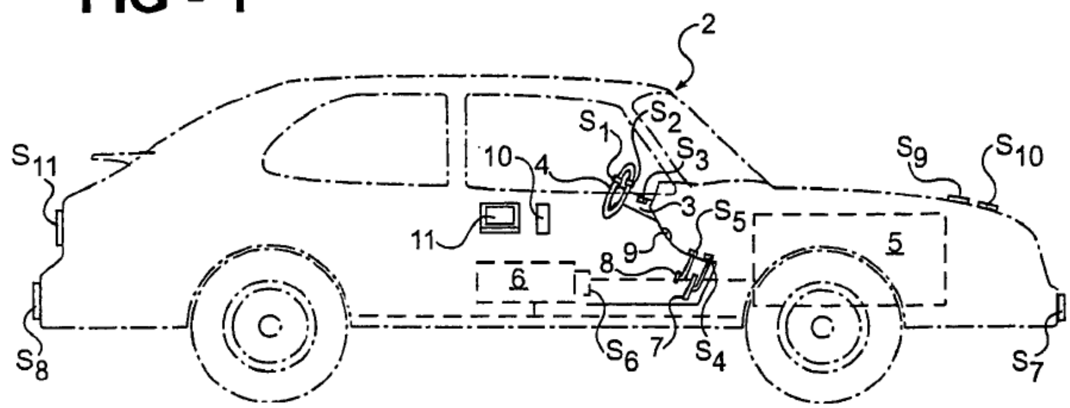
B. Overview of the '108 Patent (Ex. 1001)

The '108 patent is titled "Safety Control System for Vehicles." Ex. 1001, code (54). The patent generally relates to the field of telematics and integrating information, communication, computing, and entertainment technologies into vehicles and, more particularly, to "safety control systems for vehicles to reduce driver distraction, avoiding potentially dangerous conditions tending to produce accidents." *Id.* at 1:16–22.

According to the '108 patent, a vehicle is "equipped with a control system for sensing a variety of risk factors and potentially dangerous conditions and for automatically executing various responses when sensing such conditions in order to avoid hazardous situations tending to increase the possibility of an accident." Ex. 1001, 5:20–29. "One response is the disabling or suppression of one or more input or output devices to avoid interaction between the devices and the driver in certain situations and conditions." *Id.* "Another response includes providing a signal to or requiring the driver to take some action to increase driver alertness and/or awareness." *Id.*

Figure 1 of the ’108 patent, reproduced below, illustrates the claimed vehicle 2:

FIG - 1



6

The ’108 patent states that “FIG. 1 schematically illustrates one form of a safety control system for vehicles constructed in accordance with the present invention.” *Id.* at 5:3–5. Figure 1 shows vehicle 2 (a “conventional vehicle”), including steering mechanism 3 (column), steering wheel 4, engine 5, torque converting means 6 (e.g., transmission and driveshaft), acceleration pedal 7, brake pedal 8, visual indicator and audio alarms 9 (collectively), cellular telephone 10 and computer 11 (identified as telematic devices), and sensors S1–S11. *Id.* at 5:63–6:9.

The safety control system included in vehicle 2 “includes a plurality of sensors [(e.g., S1–S11)] for sensing various conditions with respect to the vehicle driver, the vehicle itself and/or the environment.” Ex. 1001, 6:16–19. Sensors S1 and S2 are on steering wheel 4 and sense a driver, sensor S3 is on steering mechanism 3 and senses changes in steering direction or actuation of the turning indicator, sensor S4 senses the condition of gas pedal 7 and/or vehicle speed or acceleration, sensor S5 senses brake pedal 8 condition, sensor S6 senses transmission condition at torque converter 6,

sensors S7 and S8 sense vehicle proximity to other vehicles, sensor S9 senses darkness or headlight activation, sensor S10 senses weather conditions, and sensor S11 senses turn signal activation. *Id.* at 6:20–43, 8:20–9:24. In addition to the cell phone and computer discussed above, the '108 patent identifies other telematic devices that provide e-mail, radio, CD or DVD play, navigation system, paging, and the like, as well as blackberry and PDA devices, etc. *Id.* at 6:5–10, 14:55–15:5.

Figure 3, reproduced below, illustrates how the '108 patent's sensors and telematics devices are interconnected in a system via microprocessor (mP) 20, which controls their functions:

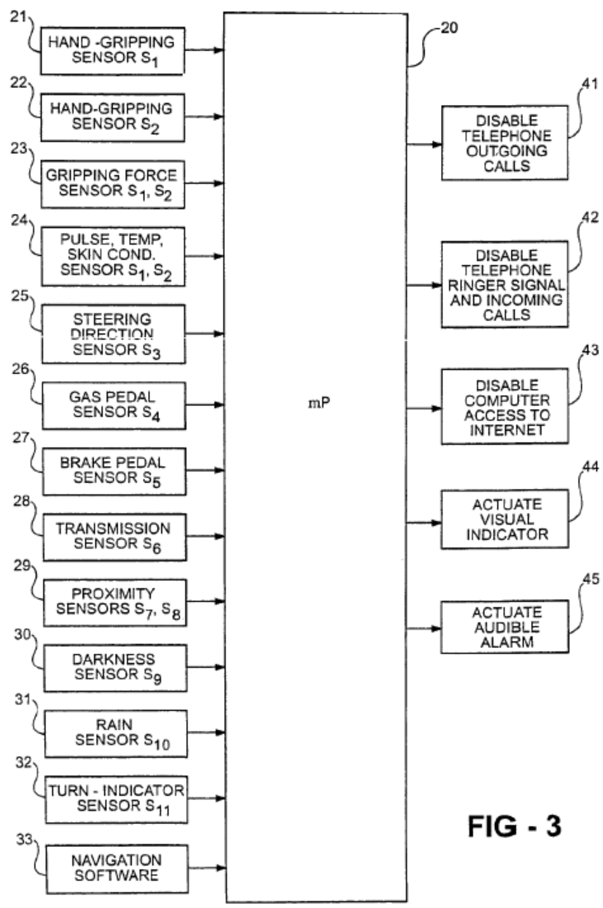


FIG - 3

The '108 patent states that "FIG. 3 is a block diagram illustrating the main components in the system of FIG. 1." Ex. 1001, 5:8–9. Figure 3 shows a

central block microprocessor (mP) 20, which is connected to and, as indicated via arrows, receives inputs 21–33 from each of sensors S1–S11, as well as navigation software 33. *Id.* at 9:25–10:52. Figure 3 also shows that microprocessor 20 is also connected with and, as indicated via arrows, provides output to control disabling of telephone outgoing calls (block 41), disabling of telephone ringer signal and incoming calls (block 42), disabling of computer access to internet (block 43), actuating of visual indicator (block 44), and actuating of audible alarm (block 45). *Id.* at 12:53–63.

The '108 patent calls microprocessor 20 a "state machine" for its ability to perform these functions. The '108 patent states:

> The state machine aspect of the microprocessor may make telematic control decisions on a variety of criteria such as: (a) the frequency of use of the application, the frequency in which a number, e-mail or URL is contacted; (b) based on safety/urgency priorities, e.g. cruise or CD changer, cell messages or other telematics, or music played on the radio; (c) as preset by the operator; (d) optionally, based on other collected information from the driving system, the microprocessor will initiate calls at predetermined times out of voice mail as, for example, when the driver completes backing out of a driveway and begins a trip.

Id. at 10:66–11:10.

Figure 4, reproduced below, illustrates the operation of the ’108 patent’s system.

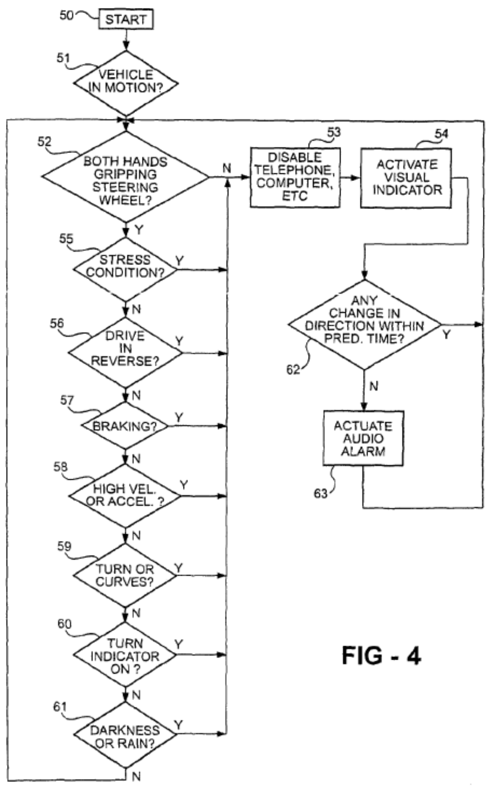


FIG - 4

The ’108 patent states that “FIG. 4 is a flowchart illustrating the operation of the system of FIG. 1.” Ex. 1001, 5:10–11. Figure 4 shows the operational and algorithmic decision making of the state machine, which (via the sensors) determines whether the vehicle is in motion (block 51) and thereafter uses sensor input to determine if potentially distracting conditions are met (blocks 51, 55–61). *Id.* at 14:1–52. If microprocessor 20 determines a distracting condition is present, it outputs signals to disable vehicle components, e.g., phone, computer, etc., and provides an indicator of the condition. *Id.* at 14:7–11. Factors that can be monitored and considered as potential distractions are numerous and are listed in Figure 5 of the ’108 patent including, for example, state of the transmission, vehicle speed, and noises. *Id.* at 17:66–18:3. The system may take certain thresholds into

consideration, for example—vehicle speeds, to determine whether to restrict, suppress, or disable components. *Id.* at 19:10–21:7. For example, if the system senses a high vehicle speed it may disable the telephone entirely, but if it senses a slower vehicle speed it may enable the telephone's operation. *See id.* at 20:31–35.

C. Illustrative Claim

The '108 patent contains 113 claims. As mentioned above, Petitioner challenges claims 1, 2, 6, 11–14, 18–20, 23, 24, 43–44, 47, 63, 79, 97, 99, and 113. Claim 1, the only independent claim, is reproduced below.[1] Ex. 1001, 22:42–61.

> [1.0] A safety control system for vehicles, including: a communication device having at least one of an input accessible from within the vehicle and at least one output communicated within the vehicle;
>
> [1.1] at least one sensor operable to sense at least one condition related to vehicle operation; and
>
> [1.2] a controller communicated with the sensor and the communication device, the controller prevents said at least one output from being provided to the driver in the original format of said at least one output and provides said at least one output to the driver in a different format, and
>
> [1.3] wherein the controller controls when at least one input and at least one output are provided to the driver so that prior to permitting the driver to access said input or prior to providing an output from the communication device to the driver, the controller determines whether said at least one condition is within a threshold and permits the driver to access

[1] For ease of reference, we use Petitioner's claim numbering scheme in brackets.

said input or provides said output to said driver only when said at least one condition is within the threshold.

D. Evidence and Asserted Grounds

Petitioner relies upon the following evidence:

(1) U.S. Patent 6,574,531 B2, issued June 3, 2003 (Ex. 1025, "Tan");

(2) U.S. Patent 6,311,078 B1, issued October 30, 2001 (Ex. 1027, "Hardouin");

(3) U.S. Patent Application Publication 2002/0070852 A1, published June 13, 2002 (Ex. 1029, "Trauner");

(4) U.S. Patent 6,166,656, issued December 26, 2000 (Ex. 1026, "Okada");

(5) U.S. Patent 6,397,133 B1, issued May 28, 2002 (Ex. 1040, "van der Pol");

(6) U.S. Patent Application Publication 2003/0036823 A1, published February 20, 2003 (Ex. 1041, "Mahvi"); and

(7) U.S. Patent 6,060,989, issued May 9, 2000 (Ex. 1039, "Gehlot").

Petitioner submits a declaration of Mr. Scott Andrews (Ex. 1003, "Andrews Decl.") in support of its contentions.

Patent Owner submits a declaration of Mr. John Peck (Ex. 2027, "Peck Decl.") in support of its contentions.

Petitioner challenges the patentability of claims of the ’108 patent on the following grounds:

Ground[2]	Claim(s) Challenged	35 U.S.C. §[3]	Reference(s)/Basis[4]
1	1, 11, 13, 18, 43, 44, 47, 63, 79, 113	103	Tan
2	1, 2, 11, 12, 18, 43, 47, 63, 79	103	Hardouin
3	19, 20, 97, 99	103	Hardouin, Okada
4	19	103	Hardouin, van der Pol
5	23, 24	103	Hardouin, van der Pol, Mahvi
6	1, 6, 14	103	Trauner
7	14	103	Hardouin, Gehlot

Pet. 3–5.

We provide an overview of Petitioner’s primary references (Tan, Hardouin, and Trauner) below:

[2] For ease of reference, we use Petitioner’s numbering scheme.
[3] The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. § 103 effective March 16, 2013. The ’108 patent has an uncontested priority date of October 24, 2001, which is before AIA revisions to 35 U.S.C. § 103 took effect on March 16, 2013. 35 U.S.C. § 100 (note). Therefore, pre-AIA § 103 applies. Our decision is not impacted, however, by which version of the statute applies.
[4] For all of the asserted grounds, Petitioner argues the claimed subject matter would have been obvious over the references and the knowledge of an ordinary artisan. Pet. 3–5. As we discuss below in Section III.E.1, Petitioner does not rely on the knowledge of an ordinary artisan to teach a claim limitation but rather to explain how the references teach the claim limitations. As Petitioner relies on the knowledge of an ordinary artisan only to elucidate the teachings of the references, we do not consider Petitioner to be relying on the knowledge of an ordinary artisan apart from the references.

1. Tan (Ex. 1025)

Tan is a patent titled "Method and Apparatus for Providing Information to an Occupant of a Vehicle." Ex. 1025, code (54). Tan's Abstract summarizes its disclosed invention as follows:

> A vehicle computer system and method of providing information to an occupant of a vehicle that minimizes complete feature lock out are provided. The operating system of the computer is adapted to selectively display full and limited functionality versions of a particular screen, preferably based on whether the vehicle is in motion. A text-to-speech engine can automatically generate audio based on a particular screen once motion is detected. The availability of a limited functionality version of the screen and audio, either independently or together, allow a vehicle occupant to retrieve information from the computer system without distraction.

Ex. 1025, code (57).

Tan's Figures 2–4, reproduced below, illustrate this concept of limiting display and functionality of screen-enabled systems of a vehicle based on detecting vehicle motion:

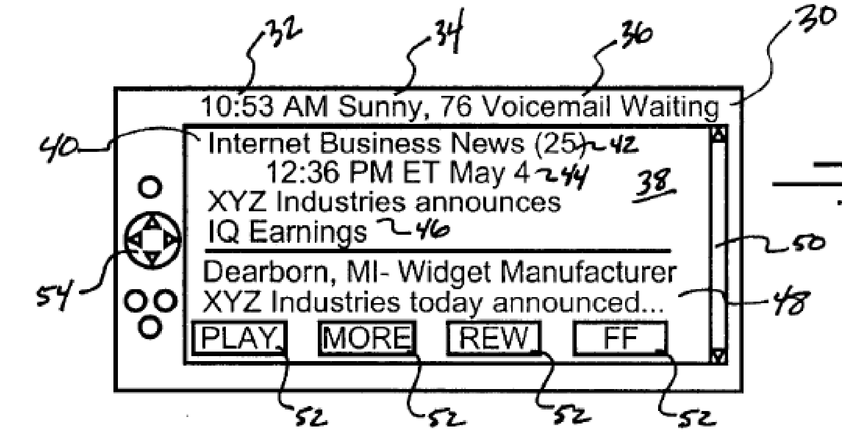


FIG. 2

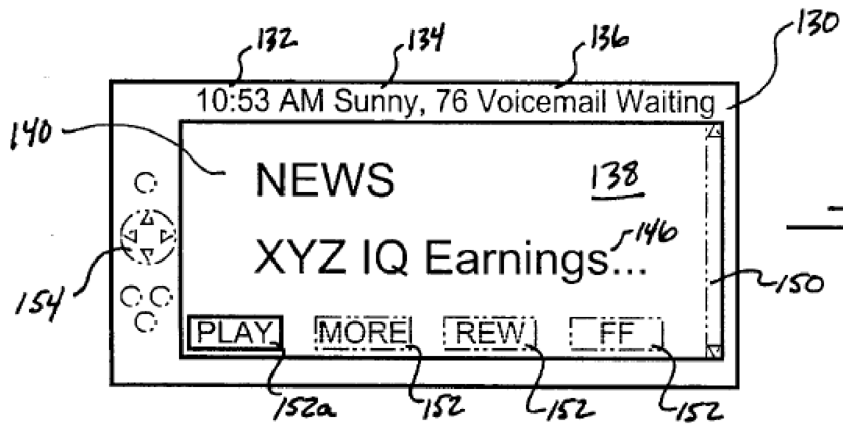


FIG. 3

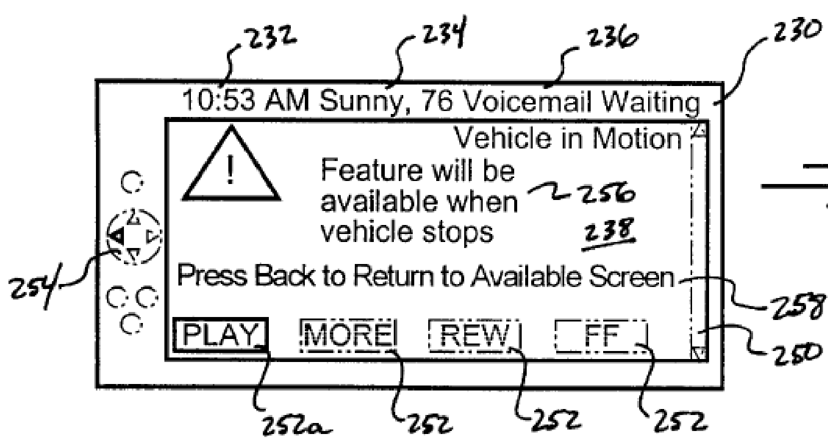


FIG. 4

Figures 2–4 show three views of a screen of a device in a vehicle. *See, e.g.*, Ex. 1025, 1:43–62, 2:39–41, 4:13–15. Tan states that "FIG. 2 is a schematic view of a full functionality version of an Internet news screen in accordance with the present invention," "FIG. 3 is a schematic of a limited functionality

version of an Internet news screen in accordance with the present invention," and "FIG. 4 is a schematic of a common screen in accordance with the present invention." *Id*. at 2:19–26. As these quoted portions of Tan indicate, Figures 2, 3, and 4 are three versions of the same in-vehicle computer system 10 having screen 14 for input (via touchscreen) and display, as well as hard buttons for input (see also Fig. 1), that illustrate decreasing degrees of information display and user-accessibility. *Id*. at 2:39–5:7.

Figure 2 shows a first, full functionality version 30 of the system where full information is displayed and full user access to all features and functions is provided. *Id*. at 4:10–33. Figure 2 shows that the device's display shows internet-derived news 40 (and details 42, 44, 46, 48, 48), a clock 32, weather summary 34, voicemail indicator 36, an active scroll bar 50 for screen navigation, active touch buttons 52, and an active directional navigator 54. *Id*.

Figure 3 shows a second, alternate, limited functionality version 130 of this system where some display and information is maintained, e.g., clock 132, weather summary 134, and voicemail indicator 136; some other display and information is modified to be abbreviated or truncated, e.g., internet news 140, with details omitted; and some functionality is unavailable, e.g., scroll bar 150, touch buttons 152, navigator 154, while some remains available, e.g., play touchscreen button 152a. *Id*. at 4:35–60.

Figure 4 shows a third, less-functional, common screen 230 to which the system defaults when the limited functionality version shown in Figure 3 is unavailable. *Id*. at 4:61–5:7. The common screen 230 preferably includes a notice 256 to inform the vehicle occupant that they have reached a point at which even limited functionality is not available; the notice states "Vehicle

in Motion" and "Feature will be available when vehicle stops." *Id*. at 5:1–7, Fig. 4.

Tan discloses that its computer system includes electronics, such as a navigation system, internet connectivity, integrated mobile phone, and radio. *Id*. at 2:39–56, 3:13–36. Tan explains how its operating system functions to select the aforementioned versions of its display and functionality, as follows:

> [T]he operating system selectively chooses which version of the screen to display based on whether the vehicle is in motion. The operating system can receive data related to vehicle motion from a motion sensor placed appropriately in the vehicle, as described above. Based on this data, the operating system preferably chooses between the two alternate versions of the screen. In the preferred method, the operating system displays the full functionality version of the screen if the vehicle is not in motion, giving an occupant of the vehicle access to all information associated with the screen. However, if the vehicle is in motion, the operating system displays the limited functionality version of the screen. This method restricts the ability of a vehicle occupant to interact with the computer system, but avoids complete lock-out of features. Of course, the application and/or computer processor can select the appropriate screen based on vehicle motion, if appropriate.
>
> It is preferred that the sensor continually monitor for motion of the vehicle. This continuous monitoring allows the operating system to switch from the full functionality version of the screen to the limited functionality version as soon as vehicle motion is detected.

Id. at 5:16–38.

Tan's electronics 16 includes text-to-speech engine 24 which comprises a computer program capable of translating textual information to audio information. Ex. 1025, 3:44–47. Tan's operating system automatically initiates the generation of audio, through the text-to-speech

engine, based on the information associated with the screen currently being displayed as soon as the sensor detects motion of the vehicle. *Id.* at 5:40–45.

2. *Hardouin (Ex. 1027)*

Hardouin is a patent titled "Automatic Shutoff for Wireless Endpoints in Motion." Ex. 1027, code (54). Hardouin's Abstract summarizes its disclosed invention as follows:

> A wireless telephone does not generate an alerting signal if the speed at which the wireless telephone is moving exceeds a predefined speed when an incoming call is received. If an alerting signal is not generated for an incoming call, the wireless telephone transmits a message back to the calling party informing them that they have contacted the wireless telephone and may leave either a voice or data message. The caller can then either leave a voice message or touch tone in the caller's telephone number. Further, the wireless telephone can inhibit the origination of calls from the wireless telephone if the speed of the wireless telephone exceeds the predefined speed. In addition, if the speed has not been equal or less than the predefined speed for a predefined amount of time, call originations and alerting signals are blocked.

Ex. 1027, code (57). Hardouin explains that this system is for preventing driver distraction by a wireless telephone. *Id.* at 1:10–16, 1:24–46.

Hardouin discloses that a control unit of a wireless telephone detects speed, e.g., of an automobile in which the telephone is traveling, via a GPS device or via the automobile's speedometer. *Id.* at 1:57–2:15. If the control unit determines that this speed is above some predefined speed, it will control the telephone so the telephone does not alert the user/driver via audio or vibration output and does not give the user/driver access to recorded information on the telephone or the ability to originate a call until the detected movement is detected to be at a rate below the predefined speed

(e.g., 5 mph) for some predefined amount of time (e.g., 30 seconds). *Id.* at 2:4–38.

Hardouin's Figure 1, reproduced below, shows a wireless telephone.

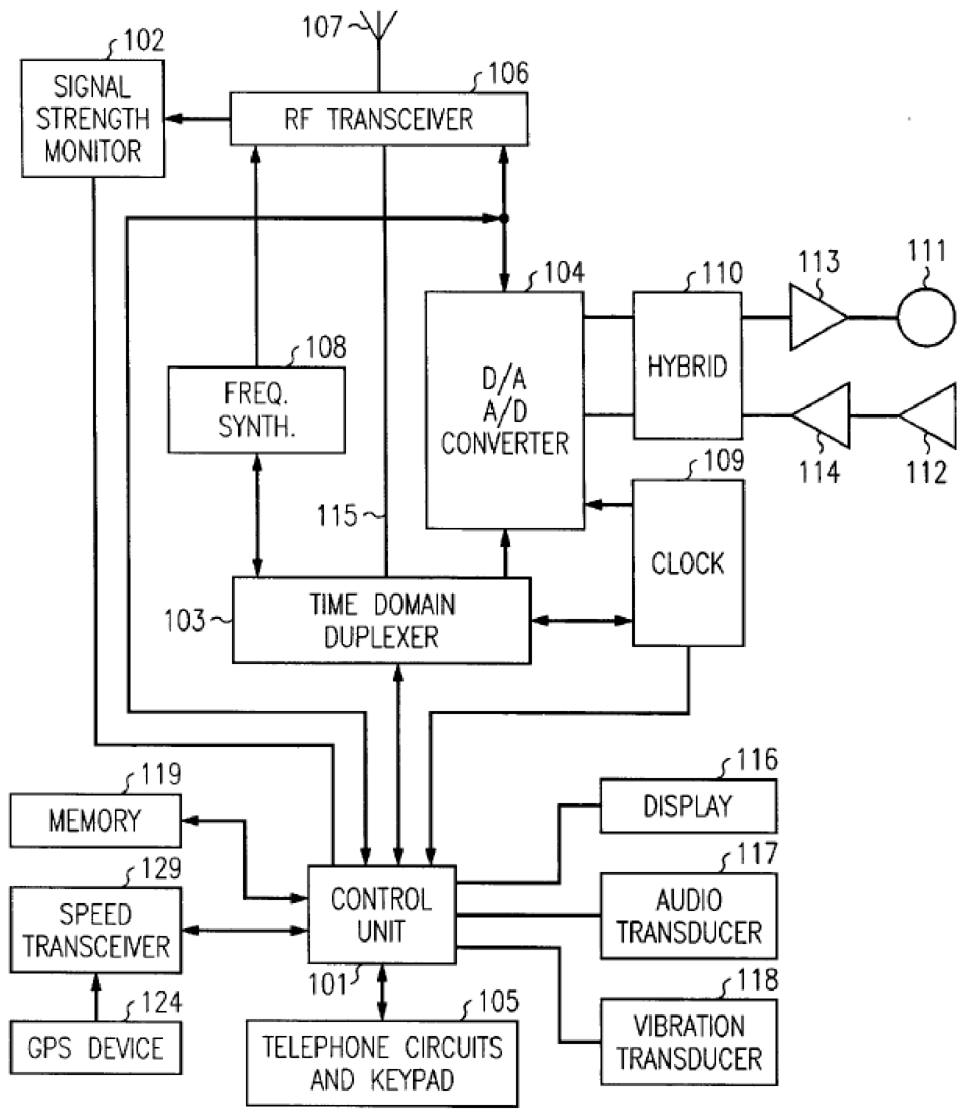


FIG. 1

Figure 1 is a block diagram illustrating a wireless telephone. *Id.* at 1:50–51. As shown in Figure 1, the wireless telephone includes, *inter alia*, control unit 101, GPS device 124, and speed transceiver 129. *See id.* at 1:57–2:3. "Speed transceiver 129 is designed to receive information that is used by [the] control unit to calculate the speed at which the wireless terminal is traveling." *Id.* at 1:67–2:3. According to Hardouin:

> Control unit 101 is responsive to the changing position information from the GPS device to determine the speed at which the wireless telephone is moving. One skilled in the art can readily see that in the case of a wireless telephone that is designed to be connected to an automobile, that speed transceiver 129 could be receiving information from the speedometer of the automobile.

Id. at 2:8–15.

The steps performed by control unit 101 of the wireless telephone are shown in Figure 2, reproduced below:

FIG. 2

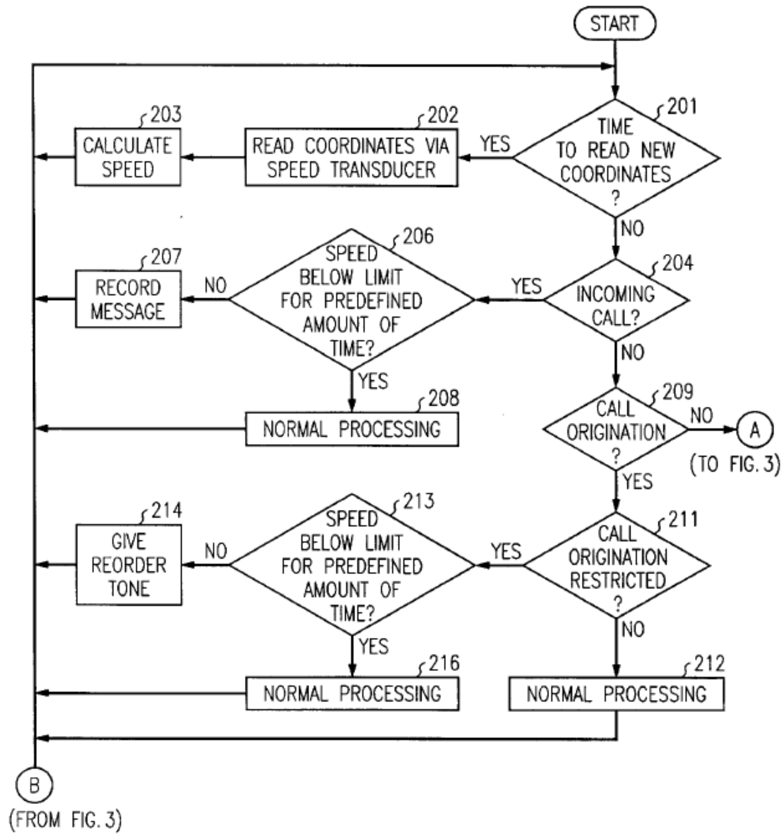


Figure 2 is a flow chart illustrating the steps performed by a wireless telephone. *Id.* at 1:52–52. In block 201, control unit 101 determines whether it is time to read new coordinates, and if so, speed transducer 129 reads coordinates from GPS device 124 in block 202. *Id.* at 2:41–47. Control unit 101 then, in block 203, calculates the speed based on the distance between new and old coordinates. *Id.* at 2:47–48. If it is not time to read new coordinates, control unit 101 determines, in block 204, whether an incoming call is being received. *Id.* at 2:52–54. If an incoming call is being received, control unit 101, in block 206, determines whether the present speed is below a limit for a predefined amount of time. *Id.* at 2:54–56. If the speed is not below the limit, the caller is instructed to leave a message in block 207; otherwise normal call processing occurs in block 208.

Id. at 2:56–65. If, at block 204, it was determined that no call is being received, then control unit 101 determines, in block 209, whether the wireless telephone user is attempting to make a call. *Id.* at 2:66–3:3. If the user is making a call, and call origination is restricted at speeds above the limit, as determined in block 211, then control unit 101 determines, in block 213, whether the present speed is below the limit for the predefined amount of time. *Id.* at 3:4–11. If the speed is not below the limit, "block 214 gives the user of the wireless telephone reorder tone before returning control back to decision block 201"; otherwise, normal call processing occurs in block 216. *Id.* at 3:11–15.

3. *Trauner (Ex. 1029)*

Trauner is a U.S. patent publication titled "Automobile Display Control System." Ex. 1029, code (54). Trauner's Abstract summarizes its disclosed invention, which states:

> A system is described that improves highway safety by preventing drivers from viewing a display or entering data while the vehicle is in motion. The system monitors the state of the vehicle and enables or disables the different system components that may include microphones, speakers, display screens and input devices such as keyboards, a mouse or a touchscreen. The system allows the vehicle to communicate with cell phones, Internet providers, Bluetooth enabled devices, and other vehicles. The system allows the driver to request information or data when the vehicle is stopped that can be downloaded and stored for later viewing when the vehicle is moving.

Ex. 1029, code (57). Figure 1, reproduced below, illustrates such a system:

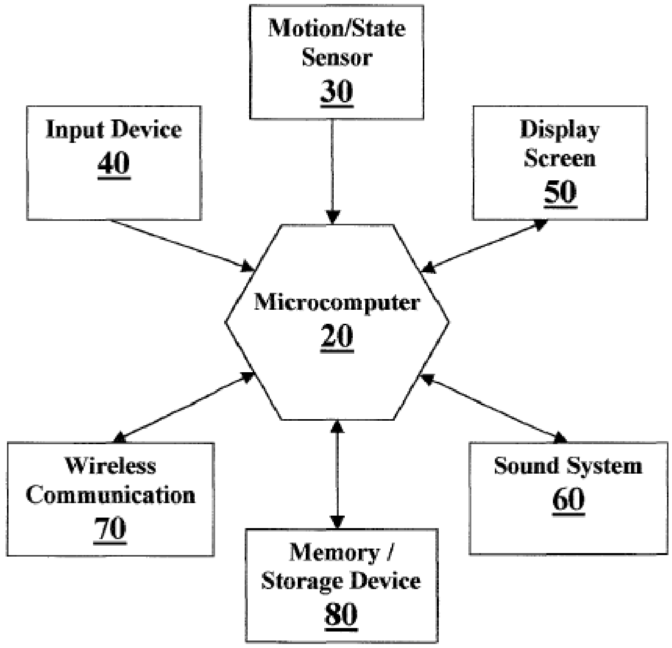


Figure 1

Trauner explains that

> FIG. 1 is block diagram showing the key components of an embodiment of the system. The system 10 includes a microcomputer 20 that controls system operation, a vehicle state/motion sensor 30, an input device 40, a display screen 50, a sound system 60, a wireless communication device 70, and a memory buffer (or alternative storage media, e.g., hard disk, writeable CD) 80. In a preferred embodiment, only the display and input devices are visible and accessible to the driver.

Id. ¶ 12. Trauner discloses that microprocessor 20 also includes a wireless communication device and a memory. *Id.* ¶ 13. Trauner discloses that wireless communication device 70 can have "standard cell phone circuitry" and can "communicate with cell phones and wireless Internet providers." *Id.* ¶ 16.

Trauner discloses that "[i]n normal use, the driver when stopped would have complete access to the system and the information that would be

downloaded. However, when the vehicle is in motion the keyboard input and display are inhibited preventing the driver from being distracted while driving." *Id.* ¶ 7. Trauner discloses, in more detail, that

> The state/motion sensor 30 can be simply a direct electrical connection to the vehicle speedometer, which provides a signal that is proportional to the speed. In this case the microprocessor compares the vehicle speed to the maximum allowable speed and if the speed is lower, then the display and input devices are enabled. In one embodiment, voice input and sound through speakers have a different maximum allowable speed than do the display screen or hand activated input devices (keyboard, mouse etc.). This would allow regular cell phone communication to occur while the vehicle was moving at normal speeds. The driver can request from the system multiple sets of data that are downloaded and displayed only when the display is enabled. However, the driver could request this information through voice recognition when the vehicle is moving. For example, the driver could request his/her email, voice mail, daily calendar, weather information, etc., to be downloaded while driving.

Id. ¶ 17. Thus, Trauner discloses that, based on sensed vehicle speed, its microprocessor controls the functionality of a cell phone where, under a certain threshold, for example normal driving speeds, regular functionality is allowed. Trauner also discloses that, "[i]n one embodiment, the state/motion sensor 30 can include a monitor of the transmission state. In this case the microcomputer could monitor whether the car was in neutral or park and use this to change the state of the system." *Id.* ¶ 19.

An embodiment where microprocessor 20 controls the functionality of in-vehicle devices based on vehicle speed is illustrated at Figure 2, reproduced below:

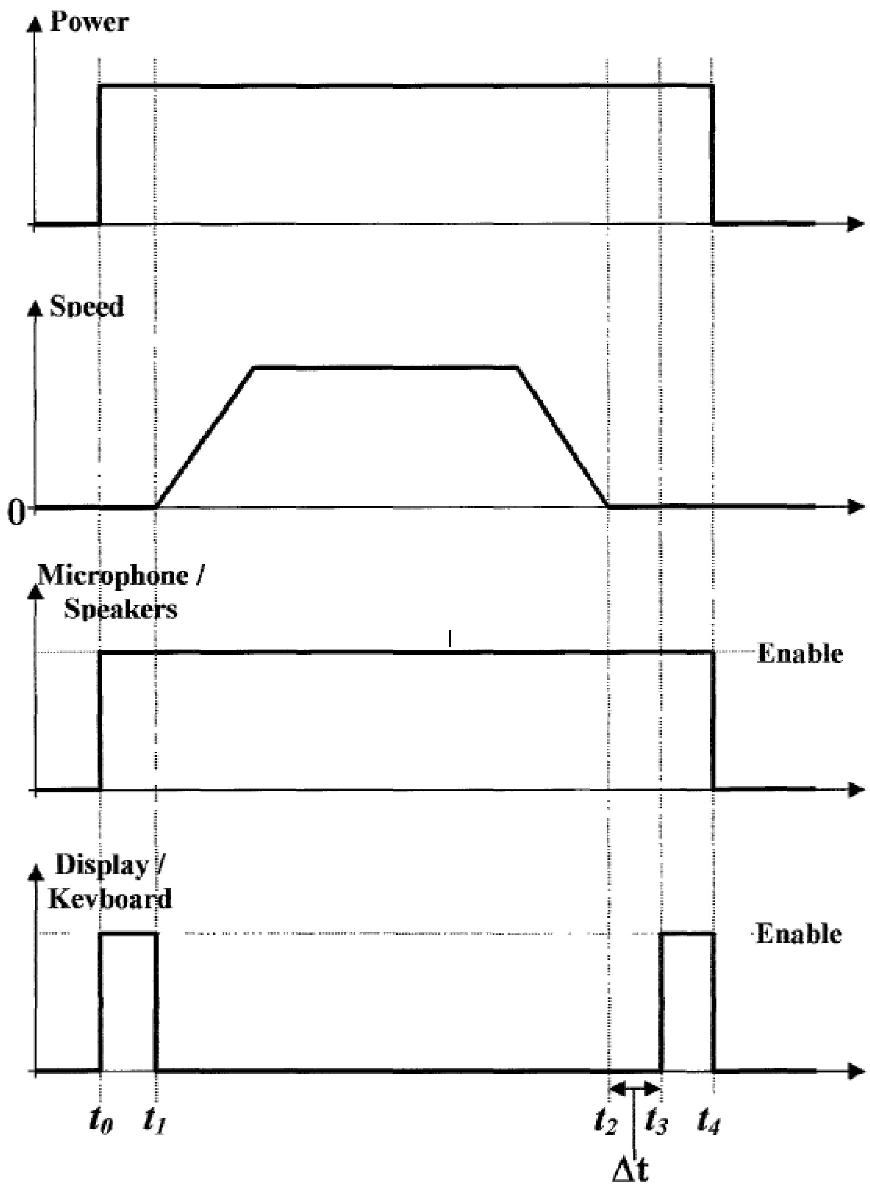


Figure 2

Figure 2 "shows a timing diagram describing how the different states of the system may operate," and compares system power state, vehicle speed/velocity, functionality of the voice and sound components of the system, and functionality of the display and keyboard/input devices of the system. *Id.* ¶ 20. As illustrated by Figure 2, (1) when the vehicle is stopped

and power is supplied, all components (such as the display, keyboard, microphone, and speakers) are fully functional until the vehicle reaches a first speed threshold (e.g., up to 2 mph), and (2) when a higher speed threshold is reached (e.g., above 2 mph), the display and keyboard are not enabled, but the microphone and speakers are enabled. *Id.* ¶¶ 20–21. Other system devices may be functional at any speed, for example, GPS maps. *Id.* ¶ 21. Trauner discloses that "[c]olored indicator lights inform a user of the system status." *Id.* ¶ 22.

III. ANALYSIS

A. Legal Standards

Petitioner bears the burden of persuasion to prove unpatentability, by a preponderance of the evidence, of the claims challenged in the Petition. *See* 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d) (2021). This burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

As mentioned above, Petitioner's challenge is based on obviousness. Pet. 5. A claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved based on underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in the record,

objective evidence of nonobviousness.[5] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

The level of ordinary skill in the art is "a prism or lens" through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *Id.*

Petitioner, with supporting declaration testimony, asserts:

> An ordinary artisan would have been a person having, as of October 24, 2001, a Bachelor's degree in Electrical Engineering, Mechanical Engineering, Computer Engineering, or Computer Science, or an equivalent degree with at least two years of experience in electronic user interface systems and vehicle sensor systems or related technologies. Additional education may substitute for lesser work experience and vice-versa.

Pet. 6 (citing Andrews Decl. ¶¶ 39–41).

Patent Owner, with supporting declaration testimony, presents the same definition of the person of ordinary skill in the art. PO Resp. 19 (citing Peck Decl. ¶¶ 20–21).

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[5] The parties have not directed us to any objective evidence of non-obviousness.

We adopt the parties' agreed definition of the person of ordinary skill in the art (or ordinarily skilled artisan) because it appears to be consistent with the level of skill in the art reflected in the prior art of record and the disclosure of the '108 patent. *See GPAC Inc.*, 57 F.3d at 1579.

C. Claim Construction

In an *inter partes* review, the claims are construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b) (2021). This claim construction standard includes construing the claim in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art. *Id.*; *see Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005). In construing claims in accordance with their ordinary and customary meaning, we consider the specification and the prosecution history of the patent. *Phillips*, 415 F.3d at 1315–17. Extrinsic evidence, including expert and inventor testimony, dictionaries, and treatises, may also be used but is less significant than the intrinsic record. *Id*. at 1315. Usually, the specification is dispositive, and it is the single best guide to the meaning of a disputed term. *Id.* Any special definitions for claim terms must be set forth in the specification with reasonable clarity, deliberateness, and precision. *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

Additionally, only terms that are in controversy need to be construed, and these need be construed only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

Petitioner asserts that the limitations of the challenged claims "can be understood based on their ordinary and customary meaning as understood by an ordinary artisan and claim construction is unnecessary." Pet. 9.

Patent Owner asserts that certain terms should be construed as follows:

(1) "threshold" means a "non-zero value (i.e., a value above stationary);"

(2) "format" means "a defined data structure arranged for the presentation or display of data" (i.e., its plain and ordinary meaning);

(3) "controller determines whether said at least one condition is within a threshold" means "the controller determines whether the at least one condition (singular) is within a threshold" (i.e., its plain and ordinary meaning. PO Resp. 19–20.

We address the parties' proposed claim constructions in the discussions below.

D. Ground 1: Asserted Obviousness of Claims 1, 11, 13, 18, 43, 44, 47, 63, 79, and 113 Over Tan

Petitioner asserts that claims 1, 11, 13, 18, 43, 44, 47, 63, 79, and 113 are unpatentable under 35 U.S.C. § 103 as being obvious over Tan. Pet. 9–27. Petitioner provides a limitation-by-limitation comparison of Tan to the challenged claims, citing the declaration of Mr. Andrews as supporting evidence. *Id*. Patent Owner opposes; focusing on claim elements 1.1 and 1.3. PO Resp. 21–41. Based on the evidence of record, we conclude Petitioner has carried its burden of proving by a preponderance of the evidence that claims 1, 11, 13, 18, 43, 44, 47, 63, 79, and 113 are unpatentable. We address the parties' contentions below.

1. Independent Claim 1

Petitioner discusses Tan and how it teaches each limitation of independent claim 1. Pet. 9–17 (citing Andrews Decl. ¶¶ 134–139, 141–144, 148–150, 155, 156, 158, 159, 163–165; Ex. 1025, Abstract, 1:43–62, 2:39–3:4, 3:24–33, 3:37–55, 4:4–9, 4:10–56, 4:61–5:4, 5:16–32, Figs. 1–4).

a) Preamble 1.0: A safety control system for vehicles, including: a communication device having at least one of an input accessible from within the vehicle and at least one output communicated within the vehicle

Petitioner contends that Tan teaches the preamble because Tan's vehicle computer system runs software applications for navigation and news and a mobile phone, and is adapted to selectively display full and limited functionality versions of a device, such as internet news display and a mobile phone, based on input from a sensor that detects whether the vehicle is in motion, to mitigate driver distraction. Pet. 9–11. Petitioner explains that Tan discloses buttons 12/52 for inputting information into the vehicle computer system and display screen 14 for outputting information from the computer system. *Id*. at 10–11.

b) Limitation 1.1: at least one sensor operable to sense at least one condition related to vehicle operation

Petitioner contends that Tan teaches this limitation by disclosing a vehicle that includes sensors 21 for determining when the vehicle is in motion (a condition related to vehicle operation) and sensors 21 are preferably associated with the speedometer, parking brake, etc. Pet. 11 (citing Ex. 1025, 4:4–9, 5:16–20; Andrews Decl. ¶¶ 141–144). We find that

Petitioner has met its burden to show that Tan teaches claim limitation 1.1. Patent Owner's arguments regarding this limitation are discussed below.

c) Limitation 1.2: a controller communicated with the sensor and the communication device, the controller prevents said at least one output from being provided to the driver in the original format of said at least one output and provides said at least one output to the driver in a different format

Petitioner contends that Tan teaches limitation 1.2 because the skilled artisan would have recognized that Tan's "electronics 16" and computer software "is capable of driving multiple displays for the same application (e.g., news) and converting text into speech and speech into data (i.e., from one format to another based on input from, for example a speed sensor)." Pet. 15 (citing Andrews Decl. ¶ 156). Petitioner asserts that, in response to sensed motion (speed greater than 0 MPH) information relayed to the computer system, Tan's computer system regulates the screen display and functionality from a first format allowing full display and functionality to a second format providing more limited display and functionality. *Id.*

Patent Owner does not contest that Tan teaches limitation 1.2. We find that Petitioner has met its burden to show that Tan teaches claim limitation 1.2.

d) Limitation 1.3: wherein the controller controls when at least one input and at least one output are provided to the driver so that prior to permitting the driver to access said input or prior to providing an output from the communication device to the driver, the controller determines whether said at least one condition is within a threshold and permits the driver to access said input or provides said output to said driver only when said at least one condition is within the threshold

Petitioner contends that Tan teaches limitation 1.3 by disclosing that the vehicle computer system provides certain outputs and inputs based on whether or not the vehicle is in motion. Pet. 15. Petitioner explains, for example, that Tan's "vehicle computer system only provides the full functionality output shown in Figure 2 of Tan when the vehicle is at rest" and "enables or disables certain inputs based on whether or not the vehicle is in motion. *Id*. at 15–16 (citing Ex. 1025, Figs. 2–3, 4:10–34, 1:43–61, 5:18–32; Andrews Decl. ¶¶ 158–159).

Petitioner explains that Tan discloses that "the threshold for limiting both the outputs of the display screen and the inputs of the various buttons is whether the vehicle is in motion;" for example, when a sensor detects the vehicle's speed is greater than 0 MPH. Pet. 17. Petitioner further explains that the skilled artisan would have recognized as common sense that "any pre-defined speed at which the system takes an action is a threshold speed, since above that speed one action is taken and below that speed another action is taken" and "the speed threshold could be set to whatever value the designer felt was appropriate." *Id*. (citing Andrews Decl. ¶ 165).

We find that Petitioner has met its burden to show that Tan teaches claim limitation 1.3. Patent Owner's arguments concerning this limitation are discussed below.

e) Patent Owner's Arguments

Patent Owner argues that Petitioner's contentions regarding limitations 1.1 and 1.3 are flawed for several reasons. PO Resp. 21–41; Sur-Reply 8–15. We explain below why we do not agree with Patent Owner's arguments. We do not necessarily address issues not in dispute. *See In re NuVasive, Inc.*, 841 F.3d 966, 974 (Fed. Cir. 2016) ("The Board [is] not required to address undisputed matters."); *see also* Paper 12, 10 (Scheduling Order emphasizing that "any arguments not raised in the response may be deemed waived").

First, Patent Owner argues that Tan does not meet limitation 1.1 because it discloses a *motion sensor* and not a *speed sensor*. PO Resp. 21–24; Sur-Reply 12–14. Patent Owner argues that Tan's motion sensing "does not teach the acquisition and/or use of speed data" (PO Resp. 25) and that claim limitation 1.1 requires "a sensor that, based on plain and ordinary meaning," senses (1) "the speed (condition) of the vehicle" and (2) data about that condition, such as speed. *Id.* at 26–28 (citing Peck Decl. ¶¶ 62–65). Discussing and citing the '108 patent's Figures 4 and 5, Patent Owner argues that the claimed invention is what is shown in these figures, which disclose sensing a variety of conditions, in a specific order, and that whether some conditions are sensed at all depends on whether a preceding condition was or was not sensed. *Id.* at 23–26; *see id.* at 11–14.

We do not agree with Patent Owner's arguments. Claim limitation 1.1 broadly recites "at least one sensor operable to sense at least one condition related to vehicle operation." Whether a vehicle is in motion is a condition related to vehicle operation. *See* Pet. 11 (citing Andrews Decl.¶¶ 141–144). Patent Owner does not persuasively explain why vehicle motion is not a condition related to vehicle operation.

Patent Owner's attempt to narrow limitation 1.1 to a speed sensor (PO Resp. 21, 23) is also unavailing because limitation 1.1 is broadly directed to any sensor (e.g., a motion sensor) operable to sense a condition related to vehicle operation (e.g., vehicle motion). Patent Owner does not persuasively explain why limitation 1.1 is limited to a speed sensor especially when the '108 patent discloses many different types of sensors. *See, e.g.*, Ex. 1001, Fig. 3 (listing sensors such as hand-gripping sensors S_1, pulse, temperature and skin condition sensors S_1, S_2, steering direction sensors S_3, gas pedal sensors S_4, brake pedal sensors S_5, transmission sensors S_6, proximity sensors S_7, S_8, darkness sensors S_9, rain sensors S_{10}, and the like), Fig. 4 and 14:2–39 (identifying sensors such as stress condition S1, S2 in block 55, direction sensor S6 in block 56, brake sensor S5 in block 57, speed sensor S6 in block 58, steering mechanism sensor S3 in block 59, turn indicator sensor S11 in block 60, darkness sensor S9 and rain sensor S10 in block 61).

We also note that, even if limitation 1.1 were limited to a speed sensor, as Patent Owner argues, Tan specifically discloses a speed sensor — stating "one or more sensors 21" are "preferably associated with the axles, wheels, ***speedometer*** . . . ." Ex. 1025, 4:4–9 (emphasis added); *see* Pet. 11.

In addition, claim 1 of the '108 patent does not restrict the sensed driving environment condition to any specific condition, much less to the series of specific conditions in Figure 4 of the '108 patent, and the '108 patent describes vehicle speed as one driving condition that may be sensed. *See* Section II.B (discussing the disclosure of the '108 patent). We find Tan's disclosure of sensing vehicle motion teaches or suggests the claim limitations, as asserted by Petitioner. Here, we do not limit the claims to one preferred embodiment of the written description, and more specifically to the embodiment in Figures 4 and 5, absent a reason to do so. *Bayer AG v.*

Biovail Corp., 279 F.3d 1340, 1348 (Fed. Cir. 2002) ("[E]xtraneous limitations cannot be read into the claims from the specification or prosecution history . . . . In other words, a court may not read into a claim a limitation from a preferred embodiment, if that limitation is not present in the claim itself."); *see also In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004) ("Absent claim language carrying a narrow meaning, the PTO should only limit the claim based on the specification or prosecution history when those sources expressly disclaim the broader definition.").

Second, Patent Owner argues that Tan teaches "*only a motion sensor* that is . . . *separate and distinct from* any speed sensor such as a speedometer" and Tan "teaches away from using a speed sensor in favor of a motion sensor and thus specifically teaches away from using speed data as opposed to motion indication." PO Resp. 23; *see id.* at 29, 38. As claim 1 does not require a speed sensor, and Tan also expressly discloses a speed sensor, these arguments do not persuasively address a patentable distinction over the prior art. Ex. 1025, 4:4–9; *see* Pet. 11.

Third, Patent Owner argues that claim limitation 1.3, which states that the controller determines whether a sensed condition, such as speed, is "within a threshold" — excludes stationary threshold values. PO Resp. 35 (citing Peck Decl. ¶¶ 80–81; Ex. 1001, 22:42–67 (claim 1). In this regard, Patent Owner argues that "threshold" means a "non-zero value (i.e., a value above stationary)." *Id.* at 20; *see id.* at 11–14. Patent Owner's position is that Tan's binary determination of whether a vehicle is or is not in motion is not the same as the claimed "condition within a threshold" (i.e., a speed threshold). *Id.* at 35. Patent Owner argues that "mere motion" does not equate to speed, data regarding a condition, and a speed threshold. *Id.* at 35–36. Patent Owner further argues that, based on the Figure 4 and 5

embodiments, a skilled artisan would have understood that the threshold in claim 1 was necessarily a non–zero value or else the invention would be rendered inoperable. Sur-Reply 5; *see id.* at 2–6.

We do not agree with Patent Owner's arguments. As we noted above, Petitioner's position is that Tan's disclosure of sensing any motion and then restricting its telematic device's output and functionality indicates Tan's speed threshold of 0 MPH as a condition determined by its system. No speed threshold is excluded by the claim, even a low threshold speed such as any speed above 0 MPH. And, even were there some limit on such a threshold, we also agree with Petitioner's point that the ordinarily skilled artisan would have also found it obvious to use any given speed, as indicated by a speedometer, as a potentially distracting condition for Tan's motion detection. *See* Pet. 17; Andrews Decl. ¶ 165 (Mr. Andrews testifying to this fact).

As asserted by Petitioner, Tan's "threshold for limiting both the outputs of the display screen and the inputs of the various buttons is whether the vehicle is in motion, *i.e.*, has a speed greater than 0 MPH." Pet. 17. Therefore, sensing such "mere motion" (as asserted by Patent Owner) would be detecting that a vehicle has exceeded a speed threshold of 0 mph.

We recognize that several paragraphs of testimony from Mr. Peck's Declaration are cited by Patent Owner as support for its argument that Tan's motion detection is insufficient. *See, e.g.*, Peck Decl. ¶¶ 52–87. Mr. Peck's testimony relies on the premise that mere motion detection does not equate to speed detection and, thus, cannot satisfy claims that require a threshold. However, as we state above, we agree with Petitioner, and its declarant, that Tan's disclosure of sensing of any vehicle motion teaches detecting speed exceeding a threshold of 0 MPH. We find this sufficient to render the

relevant claimed subject matter obvious even without considering the fact that the ordinarily skilled artisan would have also found it obvious to use any speed threshold for this sensing and device control, which the evidence also supports. *See* Andrews Decl. ¶ 165 (Mr. Andrews testifying that "any pre-defined speed at which the system takes action is a threshold speed," "[a]n ordinary artisan would also have understood that the speed threshold could be set to whatever value the designer felt was appropriate," and "[a]n ordinary artisan would have readily understood that the speed threshold in Tan (e.g. >0 MPH) is a configurable and flexible value that, as described in Tan, can be used to limit information and functionality presented to the driver.").

Fourth, Patent Owner argues that Petitioner uses expert testimony to rewrite Tan's Specification "under the guise of common knowledge" to use Tan to invalidate the challenged claims and this "represents the most egregious form of impressible hindsight reconstruction." PO Resp. 36–38.

We disagree with Patent Owner's characterization of Petitioner's asserted obviousness based on Tan. Contrary to Patent Owner's argument, Petitioner is not relying on the knowledge of the skilled artisan to supply claim limitations missing from Tan. Rather, Petitioner relies on the knowledge of the skilled artisan to explain that a skilled artisan would understand a particular teaching in Tan to disclose a claim limitation. *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) ("[A] prior art reference must be 'considered together with the knowledge of one of ordinary skill in the pertinent art.'"); *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991) (explaining that testimony from those skilled in the art may be used to explain the meaning of a reference).

For example, Petitioner contends "an ordinary artisan would have understood that [Tan's] vehicle transitioning from at rest to in motion (e.g., >0 MPH) is a threshold," as recited in claim limitation 1.3. Pet. 17 (citing Andrews Decl. ¶ 165). Moreover, to the extent Petitioner is arguing an ordinary artisan would have understood Tan discloses each and every claim limitation, "a disclosure that anticipates under § 102 also renders the claim invalid under § 103, for 'anticipation is the epitome of obviousness.'" *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983); *see also Application of Pearson*, 494 F.2d 1399, 1402 (CCPA 1974) ("[T]his court has sanctioned the practice of nominally basing rejections on §103 when, in fact, the actual ground of rejection is that the claims are anticipated by the prior art. The justification for this sanction is that a lack of novelty in the claimed subject matter, e.g., as evidenced by a complete disclosure of the invention in the prior art, is the 'ultimate or epitome of obviousness.'" (citations and footnote omitted)).

Moreover, the Petition relies solely on evidence from the prior art, and we determine that no hindsight was improperly relied upon in Petitioner's obviousness assertions based on Tan. *See In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971) ("Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper.").

f) Summary of Claim 1

In view of the evidence of record, Petitioner has accounted for all elements of claim 1 in Tan's disclosure by a preponderance of evidence. We

agree with Petitioner that Tan teaches the safety control system of claim 1 and renders claim 1 obvious.

2. Claim 11

Dependent claim 11 recites

> 11. The system of claim 1 wherein said controller prevents an attempted input or output in response to a sensed parameter of said at least one condition being outside of a threshold and is operable to permit access to a said input or communication of a said output from the communication device after said sensed condition that caused prevention of the attempted input or output is again sensed to be within the threshold limit.

Ex. 1001, 23:30–36.

Petitioner discusses how Tan teaches the recited subject matter and explains that Tan prevents display of the full functionality version and instead provide the limited functionality version when the vehicle is in motion. Pet. 40–42 (citing Ex. 1027, Abstract, 1:25–40, 2:16–3:13, Fig. 2; Andrews Decl. ¶¶ 257–261). The limited functionality version limits some inputs and outputs of the display when the vehicle is in motion and permits access to these restricted inputs and outputs when the vehicle is no longer in motion. *Id*.

In its Response, Patent Owner does not address Petitioner's assertions or the patentability of claim 11 in any way other than its arguments over claim 1 discussed above. PO Resp. 39–40 ("Dependent claims 11, 13, 18, 43–44, 47, 63, 79 are therefore patentable for at least the same reasons" as claim 1.). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 11 in Tan's disclosure. We find that Petitioner has demonstrated by a preponderance of the evidence that Tan teaches the safety control system of claim 11 and renders claim 11 obvious.

In its Sur-Reply, Patent Owner's raises for the first time a new argument that claims 11, 13, 43, and 44 "all specify a *sensed parameter* being outside a threshold as the basis for modifying an output, not only the condition itself." Sur-Reply 10. This argument could have and should have been raised in Patent Owner's Response. Because Patent Owner first raised this argument in the Sur-Reply, Patent Owner prevented Petitioner from addressing it. Thus, as explained in further detail below, we grant Petitioner's Motion to Strike this new, untimely argument. Paper 19.

3. Claim 13

Dependent claim 13 recites

> 13. The system of claim 11 wherein said controller enables an output detectable by the driver of the vehicle, and said output provides information to the driver as to a driving modification that can be made to re-enable the suppressed input or output.

Ex. 1001, 23:42–46.

Petitioner discusses how Tan teaches the recited subject matter. Pet. 18–19 (citing Andrews Decl. ¶¶ 185–188; Ex. 1025, 4:61–67, 5:1–7, Fig. 4). According to Petitioner, Tan discloses a common screen "for displaying on the output when a limited functionality version of the screen is not available" and Figure 4, for example, illustrates the common screen when the "vehicle in motion" and that the "[f]eature will be available when vehicle stops." *Id*. at 19 (citing Ex. 1025, 4:61–67, Fig. 4; Andrews Decl. ¶ 185).

In its Response, Patent Owner does not address Petitioner's assertions or the patentability of claim 13 in any way other than its arguments over claim 1 discussed above. PO Resp. 39–40 ("Dependent claims 11, 13, 18, 43–44, 47, 63, 79 are therefore patentable for at least the same reasons" as claim 1.). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 13 in Tan's disclosure. We determine that Petitioner has demonstrated by a preponderance of the evidence that Tan teaches the safety control system of claim 13 and renders claim 13 obvious.

In its Sur-Reply, Patent Owner's raises for the first time a new argument that claims 11, 13, 43, and 44 "all specify a *sensed parameter* being outside a threshold as the basis for modifying an output, not only the condition itself." Sur-Reply 10. This argument could have and should have been raised in Patent Owner's Response. Because Patent Owner first raised this argument in the Sur-Reply, Patent Owner prevented Petitioner from addressing it. Thus, as discussed below, we grant Petitioner's Motion to Strike this new, untimely argument. Paper 19.

4. Claim 18

Dependent claim 18 recites

> 18. The system of claim 1 wherein said at least one sensor is operable to determine at least one of instantaneous acceleration or velocity of the vehicle.

Ex. 1001, 23:65–67.

Petitioner asserts Tan teaches the recited subject matter because sensors 21 are associated with the speedometer, which measures

instantaneous velocity. Pet. 20 (citing Ex. 1025, 4:4–9; Andrews Decl. ¶¶ 190–193).

Repeating its arguments made in connection to claim 1, Patent Owner argues Petitioner's assertions are flawed because "*Tan* does not use a speed sensor or speed data but rather a mere motion sensor in its system" and "[i]t is irrelevant that motion sensor 21 is 'associated' with speedometer because the speedometer output is intentionally disregarded in favor of motion sensor information for a specific reason — namely to ensure the action point is maintained at the point of motion to minimize driver distraction while the vehicle is moving." PO Resp. 40 (citing Peck Decl. ¶ 88); *see also id.* at 39–40. Patent Owner further argues that Tan's motion sensor cannot measure instantaneous acceleration or velocity. Sur-Reply 14–15.

We do not agree with Patent Owner's arguments because Tan's sensors/speedometer measures instantaneous velocity and for the reasons discussed above in connection with claim 1. Ex. 1025, 4:4–9; *see* Andrews Decl. ¶¶ 190–193.

Petitioner has persuasively accounted for all elements of claim 18 in Tan's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Tan teaches the safety control system of claim 18 and renders claim 18 obvious.

5. *Claim 43*

Dependent claim 43 recites

> 43. The system of claim 1 wherein the controller suppresses at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold.

Ex. 1001, 25:27–30.

Petitioner discusses how Tan teaches the recited subject matter. Pet. 20. Referring to Figures 2 and 3, Petitioner explains that, in "response to the vehicle going into motion, the display 14 is switched from the full functionality version 30 to the limited functionality version 130" and "the limited functionality version 130 truncates or removes some information shown on the display 14 (suppressed outputs) and deactivates some of the touch buttons (suppressed inputs)." *Id*. (citing Ex. 1025, 4:10–60; Andrews Decl. ¶¶ 196–198).

In its Response, Patent Owner does not address Petitioner's assertions or the patentability of claim 43 in any way other than its arguments over claim 1 discussed above. PO Resp. 39–40 ("Dependent claims 11, 13, 18, 43–44, 47, 63, 79 are therefore patentable for at least the same reasons" as claim 1.). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 43 in Tan's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Tan teaches the safety control system of claim 43 and renders claim 43 obvious.

In its Sur-Reply, Patent Owner's raises for the first time a new argument that claims 11, 13, 43, and 44 "all specify a *sensed parameter* being outside a threshold as the basis for modifying an output, not only the condition itself." Sur-Reply 10. This argument could have and should have been raised in Patent Owner's Response. Because Patent Owner first raised this argument in the Sur-Reply, Patent Owner prevented Petitioner from addressing it. We grant Petitioner's Motion to Strike this new, untimely argument. Paper 19.

6. Claim 44

Dependent claim 44 recites

> 44. The system of claim 1 wherein the controller includes an output to provide to a driver of the vehicle an indication of the sensed parameter causing the prevention of said at least one of said input and said output.

Ex. 1001, 25:31–34.

Petitioner discusses how Tan teaches the recited subject matter. Pet. 21–22. Referring to its discussion with regard to claim 13, Petitioner explains that "Tan provides a notice 256 'vehicle in motion' and '[f]eature will be available when vehicle stops.'" *Id.* at 22 (citing Ex. 1025, 5:1–7, Fig. 4). Notice 256 indicates to the driver that the sensed parameter of vehicle motion is causing the prevention of displaying the limited functionality content 138 and/or the full functioning content 38. *Id.* (citing Andrews Decl. ¶ 202).

In its Response, Patent Owner does not address Petitioner's assertions or the patentability of claim 43 in any way other than its arguments over claim 1 discussed above. PO Resp. 39–40 ("Dependent claims 11, 13, 18, 43–44, 47, 63, 79 are therefore patentable for at least the same reasons" as claim 1.). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 44 in Tan's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Tan teaches the safety control system of claim 44 and renders claim 44 obvious.

In its Sur-Reply, Patent Owner's raises for the first time a new argument that claims 11, 13, 43, and 44 "all specify a *sensed parameter* being outside a threshold as the basis for modifying an output, not only the

condition itself." Sur-Reply 10. This argument could have and should have been raised in Patent Owner's Response. Because Patent Owner first raised this argument in the Sur-Reply, Patent Owner prevented Petitioner from addressing it. We grant Petitioner's Motion to Strike this new, untimely argument. Paper 19.

7. Claim 47

Dependent claim 47 recites

> 47. The system of claim 1 wherein the controller activates an output to provide a visible, tactile or data signal detectable in at least one of within the vehicle or outside of the vehicle in response to a sensed parameter of said at least one condition being outside of a threshold.

Ex. 1001, 25:43–47.

Petitioner discusses how Tan teaches the recited subject matter. Pet. 22–23. Petitioner explains that Tan discloses the common screen, which expressly states "vehicle is in motion" and "[f]eature will be available when vehicle stops." *Id.* (citing Ex. 1025, Fig. 4, 5:1–7). Tan's common screen provides a visible signal that the driver can see indicating that the vehicle is outside the threshold, i.e., not stopped but instead in motion. *Id.* at 23 (citing Andrews Decl. ¶ 208).

In its Response, Patent Owner does not address Petitioner's assertions or the patentability of claim 47 in any way other than its arguments over claim 1 discussed above. PO Resp. 39–40 ("Dependent claims 11, 13, 18, 43–44, 47, 63, 79 are therefore patentable for at least the same reasons" as claim 1.). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 47 in Tan's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Tan teaches the safety control system of claim 47 and renders claim 47 obvious.

8. Claim 63

Dependent claim 63 recites

> 63. The system of claim 1 wherein when the controller controls an output the output is changed to a different output.

Ex. 1001, 26:56–57.

Petitioner discusses how Tan teaches the recited subject matter. Pet. 23–24. Petitioner explains that "Tan changes the content of the display when switching between the fully functional version and the limited functionality version" and "[w]hen Tan changes the display, the display is changed from the full functionality version (first output) to the limited functionality version (different output)." *Id.* at 23 (citing Ex. 1025, 4:39–60; Andrews Decl. ¶ 213).

Patent Owner does not address Petitioner's assertions or the patentability of claim 63 in any way other than its arguments over claim 1 discussed above. PO Resp. 39–40 ("Dependent claims 11, 13, 18, 43–44, 47, 63, 79 are therefore patentable for at least the same reasons" as claim 1.). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 63 in Tan's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Tan teaches the safety control system of claim 63 and renders claim 63 obvious.

9. Claim 79

Dependent claim 79 recites

> 79. The system of claim 1 wherein the sensor is responsive to a driver initiated action.

Ex. 1001, 27:46–47.

Petitioner discusses how Tan teaches the recited subject matter. Pet. 24–25. Petitioner explains that Tan's sensor 21 senses driver-initiated speed changes of the vehicle because sensors 21 associated with the speedometer determine when the vehicle is in motion and an ordinary artisan would have "recognized as common sense that vehicles have an accelerator pedal and a brake pedal allowing the driver to change vehicle speed." *Id.* (citing Ex. 1025, 4:4–9; Andrews Decl. ¶¶ 216–217, 220).

Petitioner further explains that because Tan's sensor 21 is associated with a parking brake, an ordinary artisan would have "recognized as common sense that a parking brake includes a sensor that senses an engagement state of the parking brake and that parking brakes are manually operated by a driver." Pet. 24–25 (citing Ex. 1025, 4:4–9; Andrews Decl. ¶ 218).

Patent Owner does not address Petitioner's assertions or the patentability of claim 79 in any way other than its arguments over claim 1 discussed above. PO Resp. 39–40 ("Dependent claims 11, 13, 18, 43–44, 47, 63, 79 are therefore patentable for at least the same reasons" as claim 1.); *see id.* at 41 ("Because sensor 21 is not a speed sensor, *Tan* is incapable of detecting a change in speed as Petitioner argues."). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 79 in Tan's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Tan teaches the safety control system of claim 79 and renders claim 79 obvious.

10. Claim 113

Dependent claim 113 recites

> 113. The system of claim 113 wherein the controller also prevents continued driver access of an input when the threshold is exceeded during driver use of the input, and the controller also prevents an output of the communication device from being communicated to the driver after the threshold is exceeded during an already initiated output from the communication device.

Ex. 1001, 30:23–29.

Petitioner discusses how Tan teaches the recited subject matter. Pet. 25–27. Petitioner explains that Tan disables inputs 152 of the display 14 when switching from the full functionality version to the limited functionality version — for example, the "MORE," "REW," and "FF" buttons are disabled when the vehicle goes into motion, i.e., exceeds a vehicle speed threshold. *Id*. (citing Ex. 1025, Figs. 2–3, 4:10–60; Andrews Decl. ¶ 221). Petitioner states that prior to the vehicle being in motion, the driver has access to the "MORE," "REW," and "FF" buttons, but once vehicle motion is detected, the display, which is showing the full functionality version, is automatically changed to the limited functioning version in which the system prevents continued driver access to the "MORE," "REW," and "FF" buttons. *Id*. (citing Ex. 1025, Fig. 2, 4:24–26, 4:16–18, 4:34–40; Andrews Decl. ¶ 222).

Patent Owner does not address Petitioner's assertions or the patentability of claim 113 in any way other than its arguments over claim 1 discussed above. PO Resp. 39–40 ("Dependent claims 11, 13, 18, 43–44, 47, 63, 79 are therefore patentable for at least the same reasons" as claim 1.). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 113 in Tan's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Tan teaches the safety control system of claim 113 and renders claim 113 obvious.

E. Ground 2: Asserted Obviousness of Claims 1, 2, 11, 12, 18, 43, 47, 63, and 79 Over Hardouin

Petitioner asserts that claims 1, 2, 11, 12, 18, 43, 47, 63, and 79 are unpatentable under 35 U.S.C. § 103 as being obvious over Hardouin. Pet. 28–48. Petitioner provides a limitation-by-limitation comparison of Hardouin to the challenged claims, citing the declaration of Mr. Andrews as supporting evidence. *Id*. Patent Owner opposes. PO Resp. 41–49. Based on the evidence of record, we conclude Petitioner has carried its burden of proving by a preponderance of the evidence that claims 1, 2, 11, 12, 18, 43, 47, 63, and 79 are unpatentable. We address the parties' contentions below.

1. Claim 1

Petitioner begins with independent claim 1 and addresses how Hardouin teaches each limitation thereof. Pet. 28–39.

a) Preamble 1.0: A safety control system for vehicles, including: a communication device having at least one of an input accessible from within the vehicle and at least one output communicated within the vehicle

Petitioner contends that Hardouin teaches the preamble because Hardouin's portable wireless telephone may be used in and out of a vehicle and has a system which regulates the input/output and functionality of the wireless telephone via software on the device based on the speed of the vehicle so as to mitigate a dangerous driving condition. Pet. 28–29. According to Petitioner, Hardouin also discloses multiple outputs of the wireless telephone. *Id*. at 29. For example, Hardouin discloses an alerting signal to notify the driver of an incoming call as well as message playback. *Id*. at 29 (citing Ex. 1027, 1:24–28, 2:17–20, 3:18–33, Figs. 1–3).

Patent Owner does not contest that Hardouin teaches the preamble. PO Resp. 41–49.

b) Limitation 1.1: at least one sensor operable to sense at least one condition related to vehicle operation

Petitioner contends that Hardouin teaches this limitation because Hardouin's portable wireless telephone has a speed transceiver 129 (connected to GPS and/or speedometer) that receives data used by its control unit to calculate vehicle speed. Pet. 29 (citing Andrews Decl. ¶ 237).

Patent Owner does not contest that Hardouin teaches this limitation. PO Resp. 41–49.

c) Limitation 1.2: a controller communicated with the sensor and the communication device, the controller prevents said at least one output from being provided to the driver in the original format of said at least one output and provides said at least one output to the driver in a different format

Petitioner contends that Hardouin teaches this limitation because Hardouin's control unit 101 performs the claimed steps in that it is in communication with the speed transceiver sensor and its associated data, and is a part of and in communication with the telephone. Pet. 30–36.

Further, Petitioner asserts that this control unit prevents application output from the telephone to the driver in an original format (full phone function and notifications) and provides it in a different format because, if the system senses a vehicle speed exceeding some predefined speed, the control unit mutes the telephone so as not to alert the user, which is a different output according to the '108 patent and related U.S. Patent 9,047,170 B2 (Ex. 1030, "the '170 patent"). *Id.* at 35–36 (citing Ex. 1001, 7:50–8:2; *see id.* at 15:6; Andrews Decl. ¶¶ 244–245).

Petitioner cites the '108 patent's disclosure that muting an alarm in response to exceeding a threshold is a form of different output for a device. *Id.* (citing Ex. 1001, 7:50–8:2, 15:6). Petitioner also cites claim 14 of the '170 patent that states, "the step of providing said at least one output to the driver in a different format comprises selecting at least one from the group consisting of . . . muting the telematic device." *Id.* (citing Ex. 1030, 23:55–59). Petitioner cites Mr. Andrews's testimony at paragraphs 244–245 as support for its position that, according to the inventor and the intrinsic record, fully muting a wireless telephone is an output different than allowing the phone to alert a user to a call (the "original format"). *Id.*

For context, the ’170 patent is a divisional application of the ’108 patent and shares the same named inventor, Mouhamad Ahmad Naboulsi, and both have substantially similar written descriptions. Ex. 1030, codes (60), (71). The ’170 patent expressly incorporates by reference the disclosure of the ’108 patent (via its application). Ex. 1030, 1:5–14. Petitioner cites *Omega Engineering, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1334 (Fed. Cir. 2003) for its holding that “the same claim term in the same patent or related patents carries the same construed meaning,” and cites *Z4 Technologies, Inc. v. Microsoft Corp.*, 507 F.3d 1340, 1348 (Fed. Cir. 2007) for its holding that it is correct to construe a claim term in a first patent as having the same meaning as the same claim term in a related patent. Reply 13; *see also* Sur-Reply 13 n.4. We agree with Petitioner’s interpretation of this claim limitation, and that Hardouin teaches it by disclosing a controller that mutes a cellular phone as a function of vehicle speed.

d) Limitation 1.3: wherein the controller controls when at least one input and at least one output are provided to the driver so that prior to permitting the driver to access said input or prior to providing an output from the communication device to the driver, the controller determines whether said at least one condition is within a threshold and permits the driver to access said input or provides said output to said driver only when said at least one condition is within the threshold

Petitioner asserts that this limitation is taught by Hardouin by disclosing that the functioning of Hardouin’s wireless telephone is inhibited (as noted above) if the speed of the wireless phone in the vehicle exceeds a predefined speed (e.g., 5 MPH). Pet. 36–39 (citing Andrews Decl. ¶¶ 247–

248; Ex. 1027, Abstract, 1:25–28, 1:37–40, 2:16–19, 2:29–32, 2:39–3:15, Figs. 2–3).

Patent Owner does not contest that Hardouin teaches this limitation. PO Resp. 41–49.

e) Patent Owner's Arguments

Patent Owner only contests Petitioner's assertions about claim limitation 1.2, which is directed to an output signal in an original format and an output signal in a different format. PO Resp. 41–48. First, Patent Owner argues that Grounds 2–5 and 7 based on Hardouin fail to show or suggest that the output provided to the driver is in the required "different format" as recited in claim element 1.2. *Id*. Patent Owner argues that Hardouin's inhibition of the alerting signal does not disclose output in a format different from an original format because disabling all features of a mobile phone or muting the phone does not qualify as output in a different format. *Id*. Patent also argues that "format" means "a defined data structure arranged for the presentation or display of data." PO Resp. 19–20; Sur-Reply 6–8.

We do not agree with Patent Owner's arguments because, as initially asserted by Petitioner (Pet. 35–36), the intrinsic record of the '108 patent and the related '170 patent and, in particular, claim 14 of the '170 patent which shares common terminology with the challenged claims, expressly defines that:

> ***providing said at least one output to the driver in a different format comprises*** selecting at least one from the group consisting of changing the volume, changing the sound effect, changing the tactile feedback, ***muting the telematic device***, converting text to speech, blocking video output but permitting audio output, and replacing video output with a different display.

Ex. 1030, 23:55–61 (dependent claim 14) (emphasis added); *see also* Reply 5–6, 11–19 (further addressing this point). The "different format" of claim 14 of the '170 patent informs the meaning of the "different format" of claim 1 of the '108 patent. *See, e.g.*, *Omega Engineering*, 334 F.3d at 1334 (holding that "the same claim term in the same patent or related patents carries the same construed meaning"); *Z4 Technologies*, 507 F.3d at 1348. The intrinsic record is clear that providing "at least one output to the driver in a different format" includes muting the telematic device, as Hardouin teaches.

Second, Patent Owner argues that the plain and ordinary definition of "muted" and "muting" as used in the patents is to "soften" or "low intensity or reduced volume" — not "silenced" or "disabled audio output" as Petitioner contends. Sur-Reply 15–22. Patent Owner's reliance on a comparison of claims 8 and 14 of the '170 patent is unhelpful because neither claim defines the terms mute or muting. *Id.* at 16–17.

Patent Owner's reliance on various dictionary definitions of "mute and "muting" are also unhelpful. Sur-Reply 18–22. As examination of the definitions provided by the parties (Exs. 1053, 2028, 2029) indicates the terms mean "deaden, soften or muffle the sound of (a thing or person)," "silence (a thing or person)," and "suppress the volume of (a loudspeaker) or the output of (an amplifier or other circuit component)."

f) Summary of Claim 1

In view of the evidence of record, Petitioner has persuasively accounted for all elements of claim 1 in Hardouin's disclosure. We determine Petitioner has shown by a preponderance of the evidence that

Hardouin teaches the safety control system of claim 1 and renders claim 1 obvious.

2. *Claim 2*

Dependent claim 2 recites

> 2. The system of claim 1 wherein said communication device includes at least one of a telephone, a pager, vehicle indicator providing an audible, text to speech, or visual output, a telematic device with an acceleration sensor, a computer, a display monitor, a GPS system, a navigation system, audio equipment, video equipment, voice recorder, wireless device permitting access to internet, WAN or LAN network server, email, SMS and text messaging, digital address book, and a digital calendar.

Ex. 1001, 22:63–23:3.

Petitioner asserts that Hardouin teaches this claim by disclosing, as discussed above in claim 1, a communication device in the form of a wireless telephone. Pet. 39 (citing Ex. 1027, Fig. 1, 1:57–58; Andrews Decl. ¶ 254).

Patent Owner does not address Petitioner's assertions or the patentability of claim 2 in any way other than its arguments over claim 1 discussed above. PO Resp. 48–49 ("dependent claims 2, 11–12, 18–43, 47, 63 and 79 are patentable for the at least the same reasons claim 1 is patentable"). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 2 in Hardouin's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Hardouin teaches the safety control system of claim 2 and renders claim 2 obvious.

3. Claim 11

Dependent claim 11 recites

> 11. The system of claim 1 wherein said controller prevents an attempted input or output in response to a sensed parameter of said at least one condition being outside of a threshold and is operable to permit access to a said input or communication of a said output from the communication device after said sensed condition that caused prevention of the attempted input or output is again sensed to be within the threshold limit.

Ex. 1001, 23:30–36.

Petitioner asserts that Hardouin teaches this claim because, as discussed in claim 1, Hardouin's control unit 101 limits a driver's ability to make and receive calls when the speed exceeds the predefined amount. Pet. 40 (citing Ex. 1027, 2:52–65, 3:4–13, Fig. 2; Andrews Decl. ¶ 257). To control output, Hardouin discloses that when the speed exceeds a predefined value or limit, the alert signal on the wireless telephone is muted, e.g., prevents audio transducer 117 and vibration transducer 118. *Id.* (citing Ex. 1027, 1:25–28, 2:16–19, 2:39–3:4, Fig. 2). Once the speed is below the predefined amount for a predefined amount of time, telephone usage returns to normal processing (at box 208) in which the audio transducer 117 and vibration transducer 118 can alert the driver to an incoming call. *Id.* (citing Andrews Decl. ¶ 261).

Patent Owner does not address Petitioner's assertions or the patentability of claim 11 in any way other than its arguments over claim 1 discussed above. PO Resp. 48–49 ("dependent claims 2, 11–12, 18–43, 47, 63 and 79 are patentable for the at least the same reasons claim 1 is patentable"). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 11 in Hardouin's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Hardouin teaches the safety control system of claim 11 and renders claim 11 obvious.

4. *Claim 12*

Dependent claims 12 recites:

> 12. The system of claim 11 wherein the controller delays access to a prevented input or communication of a prevented output from the communication device for a predetermined period after the sensed condition is again sensed to be within the threshold limit.

Ex. 1001, 23:37–41.

Petitioner asserts that Hardouin teaches this claim because, as discussed in claims 1 and 11, Hardouin's control unit 101 prevents access to inputs and the communications of outputs from the communication device, and delays "access to the prevented input/output until the speed is *below the limit for a predefined time*." Pet. 43 (citing Ex. 1027, 2:26–38, 2:52–65, 3:4–13, Fig. 2; Andrews Decl. ¶¶ 264–265).

Patent Owner does not address Petitioner's assertions or the patentability of claim 12 in any way other than its arguments over claim 1 discussed above. PO Resp. 48–49 ("dependent claims 2, 11–12, 18–43, 47, 63 and 79 are patentable for the at least the same reasons claim 1 is patentable"). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 12 in Hardouin's disclosure. We determine Petitioner has shown by a

preponderance of the evidence that Hardouin teaches the safety control system of claim 12 and renders claim 12 obvious.

5. *Claim 18*

Dependent claim 18 recites

> 18. The system of claim 1 wherein said at least one sensor is operable to determine at least one of instantaneous acceleration or velocity of the vehicle.

Ex. 1001, 23:65–67.

Petitioner asserts that Hardouin teaches this claim because Hardouin's speed transceiver that receives information from the speedometer is used as a sensor to detect the instantaneous velocity of the vehicle. Pet. 45–46 (citing Andrews Decl. ¶ 269).

Patent Owner does not address Petitioner's assertions or the patentability of claim 18 in any way other than its arguments over claim 1 discussed above. PO Resp. 48–49 ("dependent claims 2, 11–12, 18–43, 47, 63 and 79 are patentable for the at least the same reasons claim 1 is patentable."). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 18 in Hardouin's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Hardouin teaches the safety control system of claim 18 and renders claim 18 obvious.

6. Claim 43

Dependent claim 43 recites

> 43. The system of claim 1 wherein the controller suppresses at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold.

Ex. 1001, 25:27–30.

Petitioner asserts that Hardouin teaches this claim because Hardouin's wireless telephone suppresses inputs and outputs when the vehicle exceeds a predefined value, e.g., speed exceeding 5 mph (a threshold). Pet. 46 (citing Ex. 1027, 2:29–30).

Patent Owner does not address Petitioner's assertions or the patentability of claim 43 in any way other than its arguments over claim 1 discussed above. PO Resp. 48–49 ("dependent claims 2, 11–12, 18–43, 47, 63 and 79 are patentable for the at least the same reasons claim 1 is patentable"). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 43 in Hardouin's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Hardouin teaches the safety control system of claim 43 and renders claim 43 obvious.

7. Claim 47

Dependent claim 47 recites

> 47. The system of claim 1 wherein the controller activates an output to provide a visible, tactile or data signal detectable in at least one of within the vehicle or outside of the vehicle in response to a sensed parameter of said at least one condition being outside of a threshold.

Ex. 1001, 25:43–47.

Petitioner asserts that Hardouin teaches this claim because Hardouin's wireless telephone provides different outputs to the driver based on speed, including played messages (box 308 in Figure 3), intermittent dial tone (box 307), terminating phone use. Pet. 47 (citing Ex. 1027, 3:18–30, 1:10–21, 2:11–14, Fig. 3; Andrews Decl. ¶¶ 278–279).

Patent Owner does not address Petitioner's assertions or the patentability of claim 47 in any way other than its arguments over claim 1 discussed above. PO Resp. 48–49 ("dependent claims 2, 11–12, 18–43, 47, 63 and 79 are patentable for the at least the same reasons claim 1 is patentable"). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 47 in Hardouin's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Hardouin teaches the safety control system of claim 47 and renders claim 47 obvious.

8. Claim 63

Dependent claim 63 recites

> 63. The system of claim 1 wherein when the controller controls an output the output is changed to a different output.

Ex. 1001, 26:56–57.

Petitioner asserts that Hardouin teaches this claim because Hardouin's wireless telephone will only allow the playback of messages after the speed has been below a threshold speed for a predefined amount of time and the reorder tone output of box 307 is a different output than the play messages

output of box 308. Pet. 47 (citing Ex. 1027, 3:18–30, Fig. 3; Andrews Decl. ¶ 282).

Patent Owner does not address Petitioner's assertions or the patentability of claim 63 in any way other than its arguments over claim 1 discussed above. PO Resp. 48–49 ("dependent claims 2, 11–12, 18–43, 47, 63 and 79 are patentable for the at least the same reasons claim 1 is patentable"). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 63 in Hardouin's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Hardouin teaches the safety control system of claim 63 and renders claim 63 obvious.

9. Claim 79

Dependent claim 79 recites

> 79. The system of claim 1 wherein the sensor is responsive to a driver initiated action.

Ex. 1001, 27:46–47.

Petitioner asserts that Hardouin teaches this claim because Hardouin's sensor senses driver-initiated speed changes of the vehicle through the speedometer. Pet. 48 (citing Ex. 1027, 1:67–2:3, 2:11–15; Andrews Decl. ¶¶ 285–286).

Patent Owner does not address Petitioner's assertions or the patentability of claim 79 in any way other than its arguments over claim 1 discussed above. PO Resp. 48–49 ("dependent claims 2, 11–12, 18–43, 47, 63 and 79 are patentable for the at least the same reasons claim 1 is

patentable"). For the reasons discussed in connection with claim 1, we do not agree with Patent Owner's arguments.

Petitioner has persuasively accounted for all elements of claim 79 in Hardouin's disclosure. We determine Petitioner has shown by a preponderance of the evidence that Hardouin teaches the safety control system of claim 79 and renders claim 79 obvious.

F. Ground 3: Asserted Obviousness of Claims 19, 20, 97, and 99 Over Hardouin and Okada

Petitioner asserts that claims 19, 20, 97, and 99 are unpatentable under 35 U.S.C. § 103 as being obvious over Hardouin and Okada. Pet. 48–58. Petitioner provides a limitation-by-limitation comparison of Hardouin and Okada to the challenged claims, citing the declaration of Mr. Andrews as supporting evidence. *Id*. Patent Owner opposes. PO Resp. 49–50; Sur-Reply 24–26. Based on the evidence of record, we conclude Petitioner has carried its burden of proving by a preponderance of the evidence that claims 19, 20, 97, and 99 are unpatentable. We address the parties' contentions below.

1. Rationale to Combine Hardouin and Okada

Petitioner asserts that a person of ordinary skill in the art would have been motivated to combine Hardouin and Okada. Pet. 48–52. According to Petitioner, an ordinary artisan would have been motivated to combine "the acceleration sensor and the external communicator disclosed in Okada with the wireless telephone system of Hardouin to provide the additional functionality of emergency services" because Hardouin seeks to improve vehicle safety by limiting telephone usage above a predefined speed and

Okada also addresses vehicle safety. *Id*. at 48–49 (citing Ex. 1027, 1:10–17; Ex. 1026, 2:6–14; Andrews Decl.¶¶ 290–291).

Petitioner explains, in part, that an ordinary artisan would have appreciated "the benefits of a vehicle safety system that ***both*** reduces the occurrence of accidents by limiting telephone functionalities based on vehicle speed as disclosed by Hardouin ***and*** that mitigates the consequences of an accident by automatically calling emergency services as disclosed by Okada." Pet. 49. "Both prior art references relate to telematics systems with safety improvements and have similar hardware" and an ordinary artisan would have been motivated "to incorporate these two safety features into a single telematics system to provide the benefit of both and further increase vehicle safety." *Id*. (citing Andrews Decl. ¶ 293).

Petitioner also explains that an ordinary artisan would have expected that combining the telephone operation of Hardouin with the emergency service notification of Okada would have yielded the predicable result of providing a single system capable of controlling driver access to input/outputs based on vehicle speed and capable of altering emergency services responsive to vehicle acceleration indicating an accident. Pet. 51. Therefore, an ordinary artisan would have been motivated to include the emergency services feature disclosed in Okada with the system disclosed in Hardouin. *Id*. (citing Andrews Decl. ¶¶ 299–300).

We agree with Petitioner's assertions and reasoning regarding combining Hardouin and Okada with a reasonable expectation of success.

2. Claim 19

Dependent claim 19 recites:

> 19. The system of claim 18 wherein the controller is responsive to vehicle acceleration indicative that the vehicle has been involved in an accident to provide an output detectable from outside of the vehicle to indicate that the vehicle has been in an accident.

Ex. 1001, 24:1–5.

Petitioner asserts that Hardouin and Okada teach or suggest this claim. Pet. 52–55. Petitioner explains that Hardouin discloses an output that is detectable outside of the vehicle but does not expressly teach that the output indicates a vehicle accident. *Id.* at 52 (citing Ex. 1027, Fig. 2, 2:52–65; Andrews Decl. ¶¶ 303–304). Okada discloses its phone may notify first responders about an accident and the driver's health condition. *Id.* at 54 (citing Ex. 1026, 1:34–45, 4:51–62; Andrews Decl. ¶ 307). Petitioner further explains that the only change required to Hardouin to place an emergency call as described by Okada is the number to call (e.g., 911) and the information to include in the automated message. *Id.* (citing Andrews Decl. ¶ 309).

3. Claim 20

Dependent claim 20 recites:

> 20. The system of claim 19 wherein said communication device is a phone and said output includes placing a call from said phone.

Ex. 1001, 24:6–8.

Petitioner asserts that Hardouin and Okada teach or suggest this claim because both Hardouin and Okada disclose wireless telephones for external communication. Pet. 55.

4. Claim 97

Dependent claim 97 recites:

> 97. The system of claim 1 wherein the sensor is responsive to at least one condition indicative that the vehicle has been in an accident and wherein the controller is responsive to such a sensed condition to provide an output detectable from outside the vehicle.

Ex. 1001, 28:50–54.

Petitioner asserts that Hardouin and Okada teach or suggest this claim. Pet. 56–57. Petitioner explains that Okada discloses the accident detector 2 can be an acceleration sensor that is used to detect an accident. *Id.* at 56 (citing Ex. 1026, 1:34–45, 4:52–62; Andrews Decl. ¶¶ 319–320). Okada also discloses an output detectable outside of the vehicle "in the form of the external communicator 3, e.g., a mobile phone call/transmission" and this mobile phone informs emergency response organizations, such as police and fire, of information regarding the accident and the drivers health condition. *Id.* at 56–57 (citing Ex. 1026, 2:27–29, claim 1).

5. Claim 99

Dependent claim 99 recites:

> 99. The system of claim 97 wherein said condition indicative that the vehicle has been in an accident includes a stopping distance of the vehicle from speed to zero is smaller than expected, the time of the vehicle to stop from speed to zero is smaller than expected, a G-force that is too high for normal maneuvers, vehicle staling after hard breaking, airbag deployment, rollover indication, or smoke detected in vehicle.

Ex. 1001, 28:50–54.

Petitioner asserts that Hardouin and Okada teach or suggest this claim. Pet. 57–58. Petitioner explains that Okada discloses that accident detector 2

may include an acceleration sensor or a roll sensor that detects overturning (or a rollover) as a condition indicative that the vehicle has been in an accident and that Okada's acceleration sensors measure G-force and detect accidents responsive to G-force measurements that are too high for normal maneuvers. *Id*. (citing Ex. 1026, 1:34–45; Andrews Decl. ¶¶ 331–332).

6. Patent Owner's Arguments

Patent Owner argues that Petitioner's contentions are flawed for several reasons. PO Resp. 49–50; Sur-Reply 24–26. We explain below why we do not agree with Patent Owner's arguments.

First, Patent Owner argues "dependent claims 19–20 and 97 and 99 are patentable over the proposed combination of *Okada* and *Hardouin* in Ground 3 for at least the same reasons that independent claim 1 is patentable over *Hardouin* in Ground 2." PO Resp. 49. As discussed above in connection with claim 1, we determine that claim 1 is unpatentable over Hardouin.

Second, Patent Owner argues that Petitioner's challenge is flawed because "Petitioner relies on extensive use of hindsight reconstruction in arriving at its flawed conclusions and fails to provide any suitable or appropriate motivation to combine the references as proposed or show any likelihood of success or expectation of such." PO Resp. 49. Patent Owner contends that "*Hardouin* is concerned with limiting driver interactions with a communication device whereas *Okada* is concerned with the opposite – initiating communications under emergency circumstances" and "*Hardouin* is concerned with preventing emergency situations whereas *Okada* is concerned with what to do after an emergency occurs." *Id*. at 50. According to Patent Owner, if "*Hardouin* is effective in achieving its goals, the

emergency situations in *Okada* likely don't occur therefore they are non-complementary solutions unrelated to one another." *Id*. (citing Peck Decl. ¶ 108).

We do not agree with Patent Owner's arguments because Petitioner's articulated reasoning is supported by rational underpinnings. *KSR*, 550 U.S. at 418. We agree with Petitioner that an ordinary artisan would have appreciated "the benefits of a vehicle safety system that ***both*** reduces the occurrence of accidents by limiting telephone functionalities based on vehicle speed as disclosed by Hardouin ***and*** that mitigates the consequences of an accident by automatically calling emergency services as disclosed by Okada" and an ordinary artisan would have been motivated "to incorporate these two safety features into a single telematics system to provide the benefit of both and further increase vehicle safety." Pet. 49 (citing Andrews Decl. ¶ 293).

Third, Patent Owner argues that the references themselves "teach away" from each other because "combining them as proposed by Petitioner results in an inoperable system or device or one that is unsuitable for its intended purpose — discouraging any such combination" and "the complicated revision of software required by *Okada* is not shown or suggested by the knowledge of an ordinary artisan." PO Resp. 50 (citing Peck Decl. ¶ 109).

We do not agree with Patent Owner's arguments. Here, nothing about Hardouin or Okada criticize, discredit, or otherwise discourage anything about the claimed invention and certainly not about using the two safety features from Hardouin and Okada into a single system to provide the benefit of both and further increase vehicle safety using speed as a threshold condition rather than mere motion. *See Fulton*, 391 F.3d at 1201.

7. Summary of Ground 3

For the reasons above, Petitioner has persuasively accounted for all elements of claims 19, 20, 97, and 99 in the combined teachings of Hardouin and Okada. We determine Petitioner has shown by a preponderance of the evidence that Hardouin and Okada teach the claimed safety control system and render claims 19, 20, 97, and 99 obvious. We agree with Petitioner's assertions and reasoning regarding combining Hardouin and Okada with a reasonable expectation of success.

G. Ground 4: Asserted Obviousness of Claim 19 Over Hardouin and van der Pool

Petitioner asserts that claim 19 is unpatentable under 35 U.S.C. § 103 as being obvious over Hardouin and van der Pol. Pet. 58–66. Petitioner provides a limitation-by-limitation comparison of Hardouin and van der Pol to the challenged claims, citing the declaration of Mr. Andrews as supporting evidence. *Id.* Patent Owner opposes. PO Resp. 51–52. Based on the evidence of record, we conclude Petitioner has carried its burden of proving by a preponderance of the evidence that claim 19 is unpatentable. We address the parties' contentions below.

1. Rationale to Combine Hardouin and van der Pol

Petitioner asserts that, as explained in Ground 2, Hardouin renders claims 1 and 18 obvious and that van der Pol teaches or suggests the limitations in claim 19. Pet. 58. Petitioner explains that an ordinary artisan would have found it obvious to combine "the acceleration sensor and the emergency mode disclosed in van der Pol with the wireless telephone of Hardouin to provide the additional functionality of emergency services." *Id.* (citing Andrews Decl. ¶ 335).

According to Petitioner, Hardouin seeks to improve vehicle safety by limiting telephone usage above a predefined speed. Pet. 58 (citing Ex. 1027, 1:10–17; Andrews Decl. ¶ 336). Petitioner contends that van der Pol also addresses vehicle safety and explains "a paramount object of the present invention [is] to provide a safety system for vehicles that helps prevent vehicle rollover accidents, or, in the event of such an accident, notifies emergency rescue and/or medical personnel of the same." *Id*. at 59 (citing Ex. 1040, 4:64–5:2, 4:22–26; Andrews Decl. ¶ 338).

Petitioner asserts that an ordinary artisan would have appreciated "the benefits of a vehicle safety system that both reduces the occurrence of accidents by limiting telephone functionalities based on vehicle speed as disclosed by Hardouin and that mitigates the consequences of a rollover accident by automatically calling emergency services as disclosed by van der Pol." Pet. 59 (citing Andrews Decl. ¶ 339). Petitioner further asserts that this ordinary artisan would have been motivated "to incorporate these two safety features into a single telematics system to provide the benefit of both and therefore further increase vehicle safety" and "by including both safety features in a single implementation, vehicle accidents may be reduced by limiting telephone use, and, if an accident should still occur, the system is able to quickly notify emergency services and others of the accident to mitigate any damage caused by the accident." *Id.*

We agree with Petitioner's assertions and reasoning regarding combining Hardouin and Okada with a reasonable expectation of success.

2. Claim 19

Dependent claim 19 recites:

> 19. The system of claim 18 wherein the controller is responsive to vehicle acceleration indicative that the vehicle has been involved in an accident to provide an output detectable from outside of the vehicle to indicate that the vehicle has been in an accident.

Ex. 1001, 24:1–5.

Petitioner asserts that Hardouin and van der Pol teach or suggest this claim. Pet. 61–66. Hardouin discloses an output that is detectable outside of the vehicle but does not expressly teach that the output indicates a vehicle accident. Pet. 62 (citing Ex. 1027, Fig. 2, 2:52–65; Andrews Decl. ¶ 349). Van der Pol discloses rollover calculator 106 receives data from an accelerometer 104 and determines whether a potential or immediate rollover condition exists. *Id*. at 62–63 (citing Ex. 1040, 10:23–56; Fig. 3-1; Andrews Decl. ¶ 353). In the event of a rollover, van der Pol transmits an emergency message. *Id*. at 65 (citing Ex. 1040, 13:65–14:5; Andrews Decl. ¶ 355).

3. Patent Owner's Arguments

Patent Owner argues that Petitioner's contentions are flawed for several reasons. PO Resp. 51–52; Sur-Reply 26–27. We explain below why we do not agree with Patent Owner's arguments.

First, Patent Owner argues "dependent claim 19 is patentable over [Hardouin and van der Pol] in Ground 4 for at least the same reasons that independent claim 1 is patentable over [Hardouin] in Ground 1." PO Resp. 51. As discussed above in connection with claim 1, we determine that claim 1 is unpatentable over Hardouin.

Second, Patent Owner argues that Petitioner's challenge is flawed because "Petitioner relies on extensive use of hindsight reconstruction in arriving at its flawed conclusions and fails to provide any suitable or appropriate motivation to combine the references as proposed or show any likelihood of success or expectation of such." PO Resp. 51. Patent Owner contends that "*Hardouin* is concerned with limiting driver interactions with a communication device whereas *van der Pol* is concerned with the opposite — initiating communications under emergency circumstances" and "*Hardouin* is concerned with preventing emergency situations whereas *van der Pol* is concerned with what to do after an emergency occurs." *Id*. According to Patent Owner, "[i]f *Hardouin* is effective in achieving its goals, the emergency situations in *van der Pol* never occur therefore they are non-complementary solutions unrelated to one another." *Id*. at 51–52 (citing Peck Decl. ¶ 112).

We do not agree with Patent Owner's arguments because Petitioner's articulated reasoning is supported by rational underpinnings. *KSR*, 550 U.S. at 418. We agree with Petitioner that an ordinary artisan would have appreciated "the benefits of a vehicle safety system that both reduces the occurrence of accidents by limiting telephone functionalities based on vehicle speed as disclosed by Hardouin and that mitigates the consequences of a rollover accident by automatically calling emergency services as disclosed by van der Pol" and an ordinary artisan would have been motivated "to incorporate these two safety features into a single telematics system to provide the benefit of both and further increase vehicle safety." Pet. 59 (citing Andrews Decl. ¶ 293).

Third, Patent Owner argues that the references "teach away" from each other because "combining them as proposed by Petitioner results in an

inoperable system or device or one that is unsuitable for its intended purpose — discouraging any such combination." PO Resp. 52 (citing Peck Decl. ¶ 113).

We do not agree with Patent Owner's arguments. Here, nothing about Hardouin or van der Pol criticize, discredit, or otherwise discourage anything about the claimed invention and certainly not about using the two safety features from Hardouin and van der Pol in a single system to provide the benefit of both and further increase vehicle safety using speed as a threshold condition rather than mere motion. *See Fulton*, 391 F.3d at 1201.

4. Summary of Ground 4

For the reasons above, Petitioner has persuasively accounted for all elements of claim 19 in the combined teachings of Hardouin and van der Pol. We determine Petitioner has shown by a preponderance of the evidence that Hardouin and van der Pol teach the claimed safety control system and render claim 19 obvious. We agree with Petitioner's assertions and reasoning regarding combining Hardouin and Okada with a reasonable expectation of success.

H. Ground 5: Asserted Obviousness of Claims 23 and 24 Over Hardouin, van der Pol, and Mahvi

Petitioner asserts that claims 23 and 24 are unpatentable under 35 U.S.C. § 103 as being obvious over Hardouin, van der Pol, and Mahvi. Pet. 66–72. Petitioner provides a limitation-by-limitation comparison of Hardouin, van der Pol, and Mahvi to the challenged claims, citing the declaration of Mr. Andrews as supporting evidence. *Id.* Patent Owner opposes. PO Resp. 52–54. Based on the evidence of record, we conclude

Petitioner has carried its burden of proving by a preponderance of the evidence that claims 23 and 24 are unpatentable. We address the parties' contentions below.

1. *Rationale to Combine Hardouin, van der Pol, and Mahvi*

Petitioner asserts that a person of ordinary skill in the art would have been motivated to combine Hardouin, van der Pol, and Mahvi. Pet. 67–70. Petitioner states that Hardouin and van der Pol are combinable for the rationale provided in Ground 4 above. *Id*. at 66. As to Mahvi, Petitioner explains that "Mahvi discloses vehicle monitoring and control systems that allow the vehicle control system to disable the vehicle responsive to unauthorized or unsafe driving" and the "control system of Mahvi allows the vehicle owner to set safety parameters, i.e., no drinking and driving. If the driver fails to adhere to any of the owner-defined parameters, the vehicle control system may disable or otherwise control the vehicle." *Id*. at 67 (citing Ex. 1041 ¶¶ 9–13; Andrews Decl. ¶ 361).

Petitioner explains, in part, that an ordinary artisan would have appreciated "the benefits of a vehicle safety system that ***both*** reduces the occurrence of accidents as disclosed by Hardouin and Mahvi ***and*** that mitigates the consequences of an accident by automatically calling emergency services as disclosed by van der Pol." Pet. 67–68 (citing Andrews Decl. ¶ 362). Similarly, an ordinary artisan would have been motivated "to incorporate these three safety features into a single telematics system in order to provide the benefit of each and therefore further increase vehicle safety" and "by including these safety features in a single implementation, vehicle accidents may be reduced, for example, by limiting telephone use, limiting vehicle speed or reducing drunk driving, and, if an

accident should still occur, the system is able to quickly notify emergency services and others of the accident to mitigate any damage caused by the accident." *Id.*

Petitioner further explains that an ordinary artisan would have understood that many of Mahvi's owner controls relate to limiting distractions — for example, the owner can limit the number of passengers, the acceptable noise within the vehicle, and drinking and driving. Pet. 68 (citing Andrews Decl. ¶ 363). According to Petitioner, adding these features with the wireless telephone system of Hardouin, which limits telephone phone use, would further reduce distractions and improve upon the distraction-reducing features of Hardouin. *Id.* An ordinary artisan would have further understood that adding van der Pol's roll-over warning and notification system to the Hardouin and Mahvi systems would have increased the safety features of the Hardouin and Mahvi systems because in the event the distraction-reduction features of Hardouin or Mahvi failed to prevent an accident, the proper emergency personnel could be contacted to get the driver needed assistance quickly." *Id*. (citing Andrews Decl. ¶ 364).

We agree with Petitioner's assertions and reasoning regarding combining Hardouin and Okada with a reasonable expectation of success.

2. Claim 23

Dependent claim 23 recites:

> 23. The system of claim 19 wherein, in addition to the output detectable from outside of the vehicle to indicate that the vehicle has been in an accident a verbal or visual countdown within the vehicle before providing said output.

Ex. 1001, 24:13–16.

As explained in Grounds 2 and 4, Hardouin discloses the limitations of base claims 1 and 18 and Hardouin and van der Pol disclose the limitations of base claim 19. Pet. 66. Petitioner asserts that the combined teachings of Hardouin, van der Pol, and Mahvi teach or suggest claim 23. *Id*. at 70–71. According to Petitioner, van der Pol discloses an output detectable from outside of the vehicle and a timer 108 for delaying the output as discussed above with respect to claim 19. *Id*. at 70 (citing Ex. 1040, 11:36–39, 12:63–13:8, Figures 7-2, 7-3; Andrews Decl. ¶¶ 374–375). Petitioner explains that van der Pol does not explicitly state that the timer 108 is communicated to the driver, but Mahvi discloses communicating a timer countdown to the driver prior to disabling features. *Id*. (citing Andrews Decl. ¶ 376; Ex. 1041 ¶¶ 46, 63, Figures 7, 12). Van der Pol's countdown may be visual or verbal countdown. *Id*. (citing Ex. 1041 ¶ 63).

3. Claim 24

Dependent claim 24 recites:

> 24. The system of claim 23 wherein said output detectable from outside of the vehicle to indicate that the vehicle has been in an accident may be aborted by the person controlling the vehicle before the output is provided.

Ex. 1001, 24:18–21.

Petitioner asserts that van der Pol and Mahvi teach or suggest claim 24 because "van der Pol discloses an emergency alarm cancel switch 34, that when pressed, cancels outputting of the emergency signal" and by "displaying the countdown of the timer 108 of van der Pol on a display as disclosed by Mahvi, the driver of van der Pol's system will be aware of how

quickly they must actuate the cancel switch 34 to prevent an output." Pet. 71 (citing Ex. 1040, 12:67–13:4). According to Petitioner, an ordinary artisan would have recognized this improved user functionality as a motivation for combining and adding the audio or visual countdown of Mahvi to the system of van der Pol and, "[a]s a matter of common sense, a cancel button prevents unnecessary notification to emergency responders, who could otherwise tend to people truly in need of emergency medical care." *Id*. (citing Andrews Decl. ¶¶ 381–382).

4. Patent Owner's Arguments

Patent Owner argues that Petitioner's contentions are flawed for several reasons. PO Resp. 52–54; Sur-Reply 27–28. We explain below why we do not agree with Patent Owner's arguments.

First, Patent Owner argues dependent claims 23 and 24 are patentable over the Hardouin, van der Pol, and Mahvi "in Ground 5 for at least the same reasons that independent claims 1, 18 and 19 are patentable over the prior art in Grounds 2 and 4." PO Resp. 52–53. As discussed above in connection with claims 1, 18, and 19, we determine that claims 1, 18, and 19 are unpatentable.

Second, Patent Owner argues that Petitioner's challenge is flawed because "Petitioner relies on extensive use of hindsight reconstruction in arriving at its flawed conclusions and fails to provide any suitable or appropriate motivation to combine the references as proposed or show any likelihood of success or expectation of such." PO Resp. 53. Patent Owner contends that "*Hardouin* is concerned with limiting driver interactions with a communication device such that the driver may remain in control of his or

her vehicle, whereas *Mahvi* is concerned with the opposite — determining when to *take control away* from the driver in response to unsafe or unauthorized driving" and "*Hardouin* is concerned with preventing unsafe driving conditions whereas *Mahvi* is concerned with what to do after unsafe driving occurs." *Id*. According to Patent Owner, if "*Hardouin* is effective in achieving its goals, the emergency situations in Mahvi — never occur therefore they are non-complementary solutions unrelated to one another." *Id*. (citing Peck Decl. ¶ 115).

We do not agree with Patent Owner's arguments because Petitioner's articulated reasoning is supported by rational underpinnings. *KSR*, 550 U.S. at 418. We agree with Petitioner that an ordinary artisan would have appreciated "the benefits of a vehicle safety system that ***both*** reduces the occurrence of accidents disclosed by Hardouin and Mahvi ***and*** that mitigates the consequences of an accident by automatically calling emergency services as disclosed by van der Pol" and an ordinary artisan would have been motivated "to incorporate these three safety features into a single telematics system in order to provide the benefit of each and therefore further increase vehicle safety." Pet. 67 (citing Andrews Decl. ¶ 362).

Third, Patent Owner argues that the references themselves "teach away" from each other because "combining them as proposed by Petitioner results in an inoperable system or device or one that is unsuitable for its intended purpose – discouraging any such combination." PO Resp. 53 (citing Peck Decl. ¶ 116).

We do not agree with Patent Owner's arguments. Here, nothing about Hardouin, van der Pol, or Mahvi criticize, discredit, or otherwise discourage anything about the claimed invention and certainly not about using the three safety features from Hardouin, van der Pol, and Mahvi in a single system to

provide the benefit of each and further increase vehicle safety. *See Fulton*, 391 F.3d at 1201.

5. *Summary of Ground 5*

For the reasons above, Petitioner has persuasively accounted for all elements of claims 23 and 24 in the combined teachings of Hardouin, van der Pol, and Mahvi. We determine Petitioner has shown by a preponderance of the evidence that Hardouin, van der Pol, and Mahvi teach the claimed safety control system and render claims 23 and 24 obvious. We agree with Petitioner's assertions and reasoning regarding combining Hardouin, van der Pol, and Mahvi with a reasonable expectation of success.

I. *Ground 7: Asserted Obviousness of Claim 14 Over Hardouin and Gehlot*

Petitioner asserts that claim 14 is unpatentable under 35 U.S.C. § 103 as being obvious over Hardouin and Gehlot. Pet. 81–90. Petitioner provides a limitation-by-limitation comparison of Hardouin and Gehlot to the challenged claims, citing the declaration of Mr. Andrews as supporting evidence. *Id*. Patent Owner opposes. PO Resp. 54–55. Based on the evidence of record, we conclude Petitioner has carried its burden of proving by a preponderance of the evidence that claim 14 is unpatentable. We address the parties' contentions below.

1. *Rationale to Combine Hardouin and Gehlot*

According to Petitioner, like Hardouin, Gehlot addresses vehicle safety and discloses "[a] system for preventing or reducing vehicle accidents." Pet. 81 (citing Ex. 1039, Abstract). Gehlot discloses sensors

that are continuously monitored by one or more processing units to determine if an alarming, unusual or above-threshold condition exists. *Id*. The safety data from one or more different sensors is gathered and weighted depending on, for example, the weather, speed of the car and road conditions, or any combination thereof. *Id*. If an above-threshold condition is detected, the system provides for a plurality of responses ranging from, for example, the giving of audio or visual warnings, to taking actual control of certain functions of the vehicle and automatically calling the police. *Id*. (citing Ex. 1039, 2:4–22; Andrews Decl. ¶ 425).

Petitioner asserts that an ordinary artisan would have appreciated "the benefits of a vehicle safety system that reduces the occurrence of accidents by limiting telephone functionalities based on vehicle speed as disclosed by Hardouin ***and*** that reduces the occurrence of accidents due to intoxication and driver fatigue as disclosed by Gehlot." Pet. 81 (citing Andrews Decl. ¶ 426). Petitioner further asserts that this ordinary artisan would have been motivated "to incorporate these two safety features into a single telematics system to provide the benefit of both and therefore further increase vehicle safety" and "by including both safety features in a single implementation, vehicle accidents may be reduced by addressing and accounting for multiple causes of accidents." *Id.*

2. Claim 14

Dependent claim 14 recites:

> 14. The system of claim 1 wherein said at least one sensor includes a plurality of sensors that sense a plurality of operating conditions and said controller includes one or more controllers that assess the sensed conditions as a function of thresholds for individual sensed conditions and as a function of

> at least one threshold for a combination of two or more sensed conditions, said one or more controllers being operable to control at least one input or output of the communication device in response to assessed conditions at or outside of said thresholds.

Ex. 1001, 23:47–56.

Petitioner asserts that Hardouin and Gehlot teach or suggest this claim. Pet. 82–89. Petitioner explains that Gehlot discloses "motion sensors, infrared sensors, position sensors, audio sensors, video sensors" and these sensors "may be used to determine vehicle speed, elapsed time, and conditions outside of the vehicle, e.g., wet/dry pavement." *Id*. at 83 (citing Ex. 1039, 3:29–30, 5:51–52, 3:16–26; Andrews Decl. ¶¶ 431–432). Gehlot also discloses sensors which monitor conditions/safety data which are indicative of the driver's ability to safely drive the vehicle. *Id*. at 84–85 (citing Ex. 1039, 4:36–43; Andrews Decl. ¶ 434).

According to Petitioner, Gehlot's processing unit 60 (i.e., controller) analyzes the safety data (e.g. high speed vs. normal speed) and determines what responses are necessary. Pet. 85. Petitioner explains that an ordinary artisan would understand the "high speed" and "normal speed" is based on thresholds and that the controller 60 compares the data from the speed sensor to one or more thresholds to determine if the vehicle is at high speed or normal speed. *Id*. (citing Andrews Decl. ¶ 410). As such, Gehlot's controller 60 assesses sensed conditions (e.g., the vehicle speed and road wetness) as a function of thresholds for individual sensed conditions. *Id*. at 86 (citing Andrews Decl. ¶¶ 437–438).

Petitioner states that Gehlot also discloses "a weighting scheme or algorithm" that considers safety data from multiple sensors (e.g., in Table 1) to determine if the driver is able to safely drive the vehicle and, if not, which

action to take. Pet. 87 (citing Ex. 1039, 5:64–6:11, Claim 1; Andrews Decl. ¶¶ 440–441). For example, Petitioner, referring to Figure 3 of Gehlot, explains that the timing for issuing an audio/visual warning is based upon the speed of the vehicle and the road wetness — the combination of two conditions and two thresholds. *Id*.

Finally, Petitioner explains that Gehlot's processing unit 60 communicates with a plurality of system outputs and inputs ports 54/56 that are capable of receiving data and/or instructions. Pet. 87–88 (citing Ex. 1039, Fig. 2, 5:1–5, 5:21–24; Andrews Decl. ¶ 444). Gehlot's outputs (audio/visual warnings) are initiated in response to assessed conditions at or outside of the above-described thresholds. *Id*. at 88 (citing Ex. 1039, Fig. 3, 6:9–22; Andrews Decl. ¶ 445). Outputs of the communication device may include providing instructions to the driver via the audio output, e.g., "take a five minute break" or automatically calling the police and dialing a friend. *Id*. (citing Ex. 1039, Figs. 2–3, 5:6–43).

3. *Patent Owner's Arguments*

Patent Owner argues that Petitioner's contentions are flawed for several reasons. PO Resp. 54–55; Sur-Reply 28–29. We explain below why we do not agree with Patent Owner's arguments.

First, Patent Owner argues "dependent claim 14 is patentable over the references in Ground 7 for at least the same reasons that independent claim 1 is patentable over the prior art in Ground 2." PO Resp. 54. As discussed above in connection with claim 1, we determine that claim 1 is unpatentable over Hardouin.

Second, Patent Owner argues that Petitioner's challenge is flawed because "Petitioner relies on extensive use of hindsight reconstruction in

arriving at its flawed conclusions and fails to provide any suitable or appropriate motivation to combine the references as proposed or show any likelihood of success or expectation of such." PO Resp. 54. Patent Owner contends that "*Hardouin* is concerned with limiting driver interactions with a communication device such that the driver may *remain in control* of his or her vehicle, whereas *Gehlot*, like *Mahvi* and others is concerned with the opposite – determining when to *take control away* from the driver in response to unsafe driving" and "*Hardouin* is concerned with preventing emergency situations whereas *Gehlot* is concerned with what to do after unsafe driving occurs." *Id*. at 55. According to Patent Owner, if "*Hardouin* is effective in achieving its goals, the emergency situations in *Gehlot* never occur therefore they are non-complementary solutions unrelated to one another." *Id*. (citing Peck Decl. ¶ 118).

We do not agree with Patent Owner's arguments because Petitioner's articulated reasoning is supported by rational underpinnings. *KSR*, 550 U.S. at 418. We agree with Petitioner that an ordinary artisan would have appreciated "the benefits of a vehicle safety system that reduces the occurrence of accidents by limiting telephone functionalities based on vehicle speed as disclosed by Hardouin ***and*** that reduces the occurrences of accidents due to intoxication and driver fatigue as disclosed by Gehlot" and an ordinary artisan would have been motivated "to incorporate these two safety features into a single telematics system to provide the benefit of both and further increase vehicle safety." Pet. 81 (citing Andrews Decl. ¶ 426).

Third, Patent Owner argues that the references "teach away" from each other because "combining them as proposed by Petitioner results in an inoperable system or device or one that is unsuitable for its intended purpose

— discouraging any such combination." PO Resp. 55 (citing Peck Decl. ¶ 119).

We do not agree with Patent Owner's arguments. Here, nothing about Hardouin or Gehlot criticize, discredit, or otherwise discourage anything about the claimed invention and certainly not about using the two safety features from Hardouin and Gehlot in a single system to provide the benefit of both and further increase vehicle safety using speed as a threshold condition rather than mere motion. *See Fulton*, 391 F.3d at 1201.

4. *Summary of Ground 7*

For the reasons above, Petitioner has persuasively accounted for all elements of claim 14 in the combined teachings of Hardouin and Gehlot. We determine Petitioner has shown by a preponderance of the evidence that Hardouin and Gehlot teach the claimed safety control system and render claim 14 obvious. We agree with Petitioner's assertions and reasoning regarding combining Hardouin and Gehlot with a reasonable expectation of success.

J. *Ground 6: Asserted Obviousness of Claims 1, 6, and 14 Over Trauner*

Petitioner asserts that claims 1, 6, and 14 are unpatentable under 35 U.S.C. § 103 as being obvious over Trauner. Pet. 72–80. Petitioner provides a limitation-by-limitation comparison of Trauner to the challenged claims, citing the declaration of Mr. Andrews as supporting evidence. *Id.* Patent Owner opposes. PO Resp. 58–61. Based on the evidence of record, we conclude Petitioner has carried its burden of proving by a preponderance

of the evidence that claims 1, 6, and 14 are unpatentable. We address the parties' contentions below.

1. Claim 1

Petitioner begins with independent claim 1 and addresses how Trauner teaches each limitation thereof. Pet. 72–77 (citing, in part, Andrews Decl. ¶¶ 366, 384–387, 389–391, 394–398, 401–403; Ex. 1029 ¶¶ 7, 12–21, Abstract, Fig. 1).

To summarize, Petitioner points to Trauner's safety system 10 (*see* Section II.D.3 above (discussing Trauner)) — which prevents drivers from viewing displays or entering data when the vehicle's speed is above a predefined speed—as teaching the preamble and claim limitations 1.1 and 1.4. Pet. 72–77. As to claim limitation 1.2, Petitioner explains that Trauner teaches that: (1) when the speed is below the predefined speed, data displays may be viewed in an original format, and (2) when the speed is above the predefined speed, the system may use voice synthesis to output data in an audio format (i.e., a format different from the original format). *Id.* at 74.

As to claim limitation 1.3, Petitioner explains that Trauner teaches that, when the vehicles exceeds the predetermined speed (i.e., the claimed "threshold condition"), the input device 40 and display screens 50 are disabled. *Id.* at 75–76. Trauner explains that different components may be activated or deactivated at different predefined speeds. Ex. 1029 ¶¶ 20–21.

a) Patent Owner's Arguments

Patent Owner does not contest that Trauner teaches the preamble and claim limitation 1.1, 1.2, and 1.4. Patent Owner argues that Trauner does not teach the "controller determines whether said at least one condition is

within a threshold" as recited claim limitation 1.3. *See* PO Resp. 56–58. According to Patent Owner, Petitioner incorrectly asserts that "access to input device 40 and display screen 50 are limited based on vehicle speed alone" (citing Pet. 75) because "*Trauner* always requires that at least *two* conditions be met before access to input device 40 and display screen 50 are permitted." *Id*. at 56. Referring to Figure 2, Patent Owner states that Trauner's "Power state variable" must be "enabled" and the "Speed state variable" must be "disabled" at the same time in order to grant access to input device 40 and display screen 50. *Id*. at 57–58.

We do not agree with Patent Owner's argument. Trauner's disclosure of power merely refers to the system being "on." Ex. 1029 ¶ 20. Trauner requires that the system be "on" before performing any additional functionality like looking at vehicle speed to determine whether to allow access to the display/keyboard. Trauner does not use power as a condition for disabling features. But even if Patent Owner's characterization of Trauner is correct, claim limitation 1.3 is not limited to utilizing a *single* condition. Claim 1 recites "at **least one** condition," which includes more than one condition—e.g., two conditions such as power or speed as argued by Patent Owner. Trauner discloses enabling/disabling driver access to the display/keyboard based on whether or not the vehicle speed is less than or greater than a threshold, e.g., 2 mph. Ex. 1029 ¶ 20.

2. Claim 6

Dependent claim 6 recites:

> 6. The system of claim 1 wherein said controller includes at least one microprocessor having at least one input in communication with the sensor and at least one output in communication with the communication device.

Ex. 1001, 23:16–19.

Petitioner asserts that Trauner teaches the recited subject matter because Trauner's microcomputer 20 includes a microprocessor, the state/motion sensor 30 is an input to the microprocessor, and the microprocessor has outputs in communication with the display screen 50, sound system 60, and wireless communication 70. Pet. 77 (citing Ex. 1029 ¶¶ 13, 17, Fig. 1; Andrews Decl. ¶¶ 406–408).

Patent Owner does not address these Petitioner's assertions. *See generally* PO Resp. 56–61 (limiting Patent Owner's arguments to claims 1 and 14).

3. *Claim 14*

Dependent claim 14 recites:

> 14. The system of claim 1 wherein said at least one sensor includes a plurality of sensors that sense a plurality of operating conditions and said controller includes one or more controllers that assess the sensed conditions as a function of thresholds for individual sensed conditions and as a function of at least one threshold for a combination of two or more sensed conditions, said one or more controllers being operable to control at least one input or output of the communication device in response to assessed conditions at or outside of said thresholds.

Ex. 1001, 23:47–56.

Petitioner asserts that Trauner teaches the subject matter of this claim. Pet. 77–80. Petitioner explains that Trauner discloses a plurality of sensors that (1) each sense individual conditions (e.g., speed, transmission state and brake pedal position) and (2) output data to a controller that compares the data to thresholds to access the sensed conditions (e.g., vehicle speed, transmission state, brake pedal position). Reply 21–22 (citing Andrews

Decl. ¶¶ 414–420); Pet. 78–80. For example, Trauner discloses comparing vehicle speed from a speedometer to a threshold, e.g., 2 mph; comparing transmission data to a threshold to determine transmission state (PARK, DRIVE, REVERSE, ETC.); and comparing brake pedal data to a threshold determine if the driver is applying the brakes. Reply 21–22.

a) Patent Owner's Arguments

Repeating its arguments made in connection with claim limitation 1.3 above, Patent Owner argues that Trauner does not teach "sensed conditions as a function of thresholds for individual sensed conditions" for limitation 14.1. PO Resp. 59–61. According to Patent Owner, because "*Trauner* always requires that at least *two* conditions be met before access to input device 40 and display screen 50 are permitted," "*Trauner* never senses conditions as a function of thresholds for individual conditions, but rather for a plurality of conditions (*i.e.*, at least two)." *Id.* at 56 (citing Peck Decl. ¶ 127). Patent Owner explains that Trauner's "microcomputer 20 always requires at least two conditions (i.e., Power and Speed) and never senses an individual signal condition to determine whether to grant or deny access to system resources such as the display/keyboard." *Id.* at 61 (citing Peck Decl. ¶¶ 129–132).

We do not agree with Patent Owner's argument. As discussed above, Trauner requires that the system be "powered on" before performing any additional functionality like looking at vehicle speed to determine whether to allow access to the display/keyboard and power is not a condition used by Trauner. Mr. Andrew credibly testifies that Trauner discloses multiple sensors that sense individual conditions (e.g., vehicle speed, transmission state, brake pedal position) and that the controller controls access to the

keyboard/display based on an assessment of the sensor data to thresholds. Andrews Decl. ¶¶ 411–412; *see* Pet. 77; Reply 29–30.

4. *Summary of Ground 6*

For the reasons above, Petitioner has persuasively accounted for all elements of claims 1, 6, and 14 in Trauner. We determine Petitioner has shown by a preponderance of the evidence that Trauner teaches the claimed safety control system and render claims 1, 6, and 14 obvious.

IV. PETITIONER'S MOTION TO STRIKE

Petitioner filed a Motion to Strike Portions of Patent Owner's Sur-Reply. Paper 19 ("Motion"). Petitioner argues that the "entirety of Section II(C)(1)(a) 'Ford does not present a *prima facie* case in Ground 1 that claims 11, 13, 43-44, and 47 are unpatentable'" (page 10, line 7 through page 12, line 15) raises new arguments. Motion, 1.

We agree. In its Sur-Reply, Patent Owner raises for the first time new arguments that claims 11, 13, 43, and 44 "all specify a *sensed parameter* being outside a threshold as the basis for modifying an output, not only the condition itself." Sur-Reply 10; *see id.* at 10–12. These arguments could have and should have been raised, if at all, in Patent Owner's Response. These arguments were, therefore, waived. *See* Paper 10, 10 ("Patent Owner is cautioned that any arguments for patentability not raised in the response may be deemed waived.) Moreover, Petitioner did not address these dependent claims in its Reply. By first raising these arguments in the Sur-Reply, Patent Owner unfairly deprived Petitioner of a full and fair opportunity to address them. We grant Petitioner's Motion to Strike these new, untimely arguments. Paper 19.

V. CONCLUSION

Petitioner establishes by a preponderance of the evidence that claims 1, 2, 6, 11–14, 18–20, 23, 24, 43, 44, 47, 63, 79, 97, 99, and 113 of the ’108 patent are unpatentable as obvious.[6]

[6] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

Our final decision is summarized as follows:

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1, 11, 13, 18, 43, 44, 47, 63, 79, 113	103	Tan	1, 11, 13, 18, 43, 44, 47, 63, 79, 113	
1, 2, 11, 12, 18, 43, 47, 63, 79	103	Hardouin	1, 2, 11, 12, 18, 43, 47, 63, 79	
19, 20, 97, 99	103	Hardouin, Okada	19, 20, 97, 99	
19	103	Hardouin, van der Pol	19	
23, 24	103	Hardouin, van der Pol, Mahvi	23, 24	
14	103	Hardouin, Gehlot	14	
1, 6, 14	103	Trauner	1, 6, 14	
Overall Outcome			1, 2, 6, 11–14, 18–20, 23, 24, 43, 44, 47, 63, 79, 97, 99, 113	

VI. ORDER

Accordingly, it is

ORDERED that Petitioner has proved by a preponderance of the evidence that claims 1, 2, 6, 11–14, 18–20, 23, 24, 43, 44, 47, 63, 79, 97, 99, and 113 of U.S. Patent No. 8,301,108 B2 are unpatentable;

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2; and

FURTHER ORDERED that Petitioner's Motion to Exclude is *granted*.

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US008301108B2

(12) **United States Patent**
Naboulsi

(10) **Patent No.: US 8,301,108 B2**
(45) **Date of Patent: Oct. 30, 2012**

(54) **SAFETY CONTROL SYSTEM FOR VEHICLES**

(76) Inventor: **Mouhamad A. Naboulsi**, West Bloomfield, MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1840 days.

(21) Appl. No.: **10/838,708**

(22) Filed: **May 4, 2004**

(65) **Prior Publication Data**

US 2004/0209594 A1 Oct. 21, 2004

Related U.S. Application Data

(63) Continuation of application No. 10/287,299, filed on Nov. 4, 2002, now Pat. No. 6,731,925.

(51) **Int. Cl.**
H04B 1/06 (2006.01)

(52) **U.S. Cl.** **455/345**; 455/569.2; 340/575; 340/576

(58) **Field of Classification Search** 455/345, 455/411, 556.1, 557, 565, 567, 569.1, 569.2, 455/575.9; 340/438, 441, 525, 575, 576, 340/901

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,103,438 A		7/1914	Scheibert	
3,223,926 A		12/1965	Maugans	
4,485,375 A		11/1984	Hershberger	
4,572,207 A		2/1986	Yoshimi et al.	
4,649,282 A	*	3/1987	Ota et al.	340/630
5,266,922 A		11/1993	Smith et al.	
5,301,227 A	*	4/1994	Kamei et al.	455/565
5,453,929 A	*	9/1995	Stove	340/575
5,521,580 A	*	5/1996	Kaneko et al.	340/439
5,543,591 A		8/1996	Gillespie et al.	
5,812,698 A		9/1998	Platt et al.	
5,813,989 A	*	9/1998	Saitoh et al.	340/576
5,855,144 A		1/1999	Parada	
5,880,411 A		3/1999	Gillespie et al.	
5,897,505 A		4/1999	Feinberg et al.	
5,915,561 A		6/1999	Lorenzana et al.	

(Continued)

FOREIGN PATENT DOCUMENTS

DE 10352733 A1 10/2004

(Continued)

OTHER PUBLICATIONS

Delphi Corporation Selected to Lead Comprehensive Driver Distraction Research Program; Delphi News Release; Oct. 30, 2002; (3 pages), Troy, Michigan.

(Continued)

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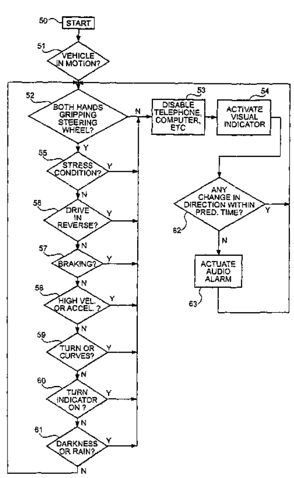
(57) **ABSTRACT**

According to one aspect of one embodiment of the present invention, a safety control system for vehicles, includes, a communication device having at least one of an input accessible from within the vehicle and an output communicated within the vehicle, at least one sensor operable to sense at least one condition related to vehicle operation, and a controller communicated with the sensor and the communication device to selectively suppress at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold. When an input is suppressed, the driver is prevented from accessing or inputting information into the communication device. When an output is suppressed, communication between the device and the driver of a vehicle is suppressed to, among other things, avoid distracting the driver during certain driving situations or conditions relating to the driver, vehicle and/or environment.

113 Claims, 4 Drawing Sheets



FORD EX. 1001, p. 1

U.S. PATENT DOCUMENTS

5,936,518	A *	8/1999	Fukui et al.	340/436
6,028,271	A	2/2000	Gillespie et al.	
6,085,078	A	7/2000	Stamegna	
6,085,278	A	7/2000	Gates et al.	
6,104,101	A	8/2000	Miller et al.	
6,107,922	A	8/2000	Bryuzgin	
6,114,949	A	9/2000	Schmitz et al.	
6,145,082	A	11/2000	Gannon et al.	
6,147,315	A	11/2000	Rudolph et al.	
6,148,251	A	11/2000	Downs	
6,154,123	A	11/2000	Kleinberg	
6,154,658	A	11/2000	Caci	
6,166,656	A *	12/2000	Okada et al.	340/901
6,188,315	B1 *	2/2001	Herbert et al.	340/438
6,209,767	B1	4/2001	Liou	
6,240,347	B1	5/2001	Everhart et al.	
6,246,933	B1	6/2001	Bague	
6,249,720	B1	6/2001	Kubota et al.	
6,253,131	B1	6/2001	Quigley et al.	
6,256,558	B1	7/2001	Sugiura et al.	
6,263,190	B1	7/2001	Mamori et al.	
6,282,906	B1	9/2001	Cauchy	
6,292,719	B1	9/2001	Seto et al.	
6,308,115	B1	10/2001	Yamaguchi et al.	
6,335,689	B1	1/2002	Mine	
6,339,700	B1	1/2002	Tsai	
6,353,778	B1	3/2002	Brown	
6,373,472	B1	4/2002	Palalay et al.	
6,380,931	B1	4/2002	Gillespie et al.	
6,381,966	B1	5/2002	Barrow	
6,414,671	B1	7/2002	Gillespie et al.	
6,418,362	B1	7/2002	St. Pierre et al.	
6,430,488	B1	8/2002	Goldman et al.	
6,434,450	B1	8/2002	Griffin, Jr. et al.	
6,434,459	B2	8/2002	Wong et al.	
6,438,465	B2	8/2002	Obradoyich et al.	
6,502,022	B1 *	12/2002	Chastain et al.	701/36
6,526,762	B1	3/2003	Barrow	
6,575,902	B1	6/2003	Burton	
6,580,973	B2	6/2003	Leivian et al.	
6,600,975	B2	7/2003	Moriguchi et al.	
6,610,936	B2	8/2003	Gillespie et al.	
6,665,600	B2	12/2003	Miller et al.	
6,675,082	B2	1/2004	Galli et al.	
6,732,534	B2	5/2004	Spry	
6,756,903	B2	6/2004	Omry et al.	
6,771,946	B1	8/2004	Oyaski	
6,775,603	B2	8/2004	Yester et al.	
6,791,462	B2	9/2004	Choi	
6,810,309	B2	10/2004	Sadler et al.	
6,812,942	B2	11/2004	Ribak	
D500,639	S	1/2005	Cauchy et al.	
6,842,677	B2	1/2005	Pathare	
6,880,941	B2	4/2005	Suggs	
6,882,906	B2	4/2005	Geisler et al.	
6,886,060	B2	4/2005	Wang et al.	
6,886,653	B1	5/2005	Bellehumeur	
6,892,116	B2	5/2005	Geisler et al.	
6,895,316	B2	5/2005	Chen et al.	
6,909,947	B2	6/2005	Douros et al.	
6,946,966	B2	9/2005	Koenig	
6,968,311	B2	11/2005	Knockeart et al.	
6,973,323	B2	12/2005	Oesterling et al.	
6,974,414	B2	12/2005	Victor	
7,009,488	B2	3/2006	Schwartz et al.	
7,019,623	B2	3/2006	Klausner et al.	
7,020,499	B2	3/2006	Moffi et al.	
7,049,941	B2	5/2006	Rivera-Cintron et al.	
7,054,723	B2	5/2006	Seto et al.	
7,062,365	B1	6/2006	Fei	
7,068,167	B2	6/2006	Brunner	
7,084,773	B2	8/2006	Oyama	
7,116,989	B2	10/2006	Mazzara et al.	
7,120,785	B1	10/2006	Bowers et al.	
7,133,753	B2	11/2006	Nakajima et al.	
7,194,347	B2	3/2007	Harumoto et al.	
7,218,213	B2	5/2007	Katagiri et al.	
7,243,012	B2	7/2007	Miyake et al.	
7,280,852	B2	10/2007	Shimizu et al.	
7,295,904	B2	11/2007	Kanevsky et al.	
7,308,247	B2	12/2007	Thompson et al.	
7,321,825	B2	1/2008	Ranalli	
7,349,782	B2	3/2008	Churchill et al.	
2001/0002449	A1	5/2001	Eisenmann et al.	
2001/0016789	A1	8/2001	Staiger	
2002/0069071	A1	6/2002	Knockeart et al.	
2002/0075168	A1	6/2002	Ablay et al.	
2002/0091706	A1	7/2002	Anderson et al.	
2002/0111725	A1	8/2002	Burge	
2002/0116156	A1	8/2002	Remboski et al.	
2002/0120371	A1	8/2002	Leivian et al.	
2002/0120374	A1	8/2002	Douros et al.	
2002/0180608	A1	12/2002	Omry et al.	
2003/0014521	A1	1/2003	Elson et al.	
2003/0065432	A1	4/2003	Shuman et al.	
2003/0073406	A1	4/2003	Benjamin et al.	
2003/0169181	A1	9/2003	Taylor	
2003/0169522	A1	9/2003	Schofield et al.	
2003/0179233	A1	9/2003	McWalter et al.	
2003/0179773	A1	9/2003	Mocek et al.	
2003/0182032	A1	9/2003	McWalter et al.	
2003/0182233	A1	9/2003	Mocek et al.	
2003/0182360	A1	9/2003	Mocek et al.	
2003/0187571	A1	10/2003	Impson et al.	
2003/0191569	A1	10/2003	Su et al.	
2003/0210150	A1	11/2003	Benedict	
2003/0216136	A1	11/2003	McBrearty et al.	
2004/0000992	A1	1/2004	Cuddihy et al.	
2004/0039509	A1	2/2004	Breed	
2004/0044454	A1	3/2004	Ross et al.	
2004/0088084	A1	5/2004	Geisler et al.	
2004/0122562	A1	6/2004	Geisler et al.	
2004/0167680	A1	8/2004	Nakajima et al.	
2004/0204795	A1	10/2004	Harvey et al.	
2004/0204796	A1	10/2004	Harvey et al.	
2004/0236474	A1	11/2004	Chowdhary et al.	
2004/0236475	A1	11/2004	Chowdhary	
2004/0236476	A1	11/2004	Chowdhary	
2004/0243292	A1	12/2004	Roy	
2005/0021190	A1	1/2005	Worrell et al.	
2005/0030184	A1	2/2005	Victor	
2006/0094412	A1	5/2006	Nonoyama et al.	
2006/0095848	A1	5/2006	Naik	
2006/0202842	A1	9/2006	Sofer	
2007/0073944	A1	3/2007	Gormley	
2007/0152803	A1	7/2007	Huang et al.	
2007/0167147	A1	7/2007	Krasner et al.	
2008/0125102	A1	5/2008	Abel et al.	

FOREIGN PATENT DOCUMENTS

JP	62-048845	3/1987
JP	09-011772	1/1997
JP	09-292261	11/1997
JP	2000-172195	6/2000
JP	2000-301964	10/2000
JP	2001-045181	2/2001
JP	2001-239897	9/2001

OTHER PUBLICATIONS

Volvo Owners Club, Volvo Press Releases; Sep. 8, 2003; (9 pages) United Kingdom.

UK Debut for All-New Volvo S40 at Scottish Motor Show; Oct. 20, 2003; (2 pages), United Kingdom.

Duncan Graham-Rowe; Smart Assistant Will Cut Driver Distraction (NewScientist.com); Dec. 7, 2003 (2 pages).

Edwin Bastiaensen; PReVENT Integrated Project for Active Safety Gets Underway (its@ertico); Feb. 3, 2004; (3 pages), Europe.

Memorandum of Understanding for Realisation of Interoperable In-Vehicle eCall (Safety Forum eCall Driving Group); May 28, 2004; (7 pages), Europe.

Dr. Juergen Schwarz; Response 3—Code of Practice for Development, Validation and Market Introduction of ADAS—A PReVENT Project (DaimlerChrysler AG); Jun. 3, 2005; (9 pages), Stuttgart, Germany.

Maria Rimini-Doering, et al.; I-TSA Traffic Safety Assessment in a Simulator Experiment with Integrated Information and Assistance Systems (Fourth International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design); Jul. 9-12, 2007; (9 pages), Stevenson, Washington.

New Solution to Texting While Driving can Save Lives (CummingHome); Jul. 11, 2007; (2 pages), Georgia.

Wheel (Version: 12); Author Unknown, Date Unknown, Where Published Unknown.

* cited by examiner

FIG - 1

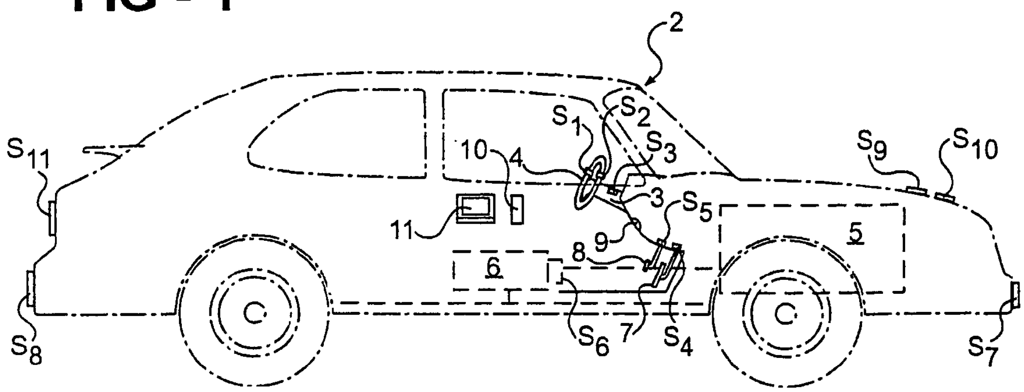
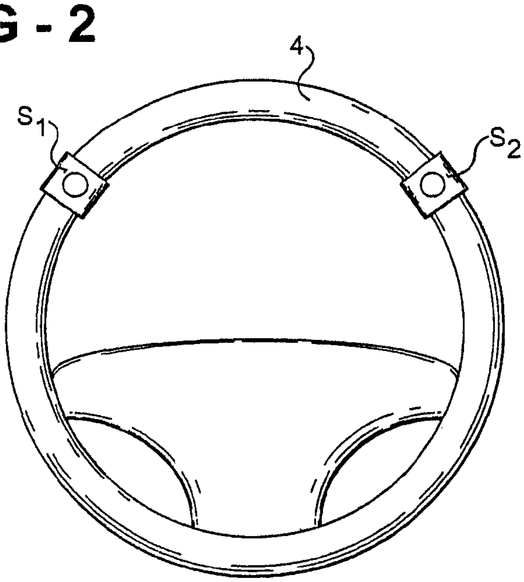
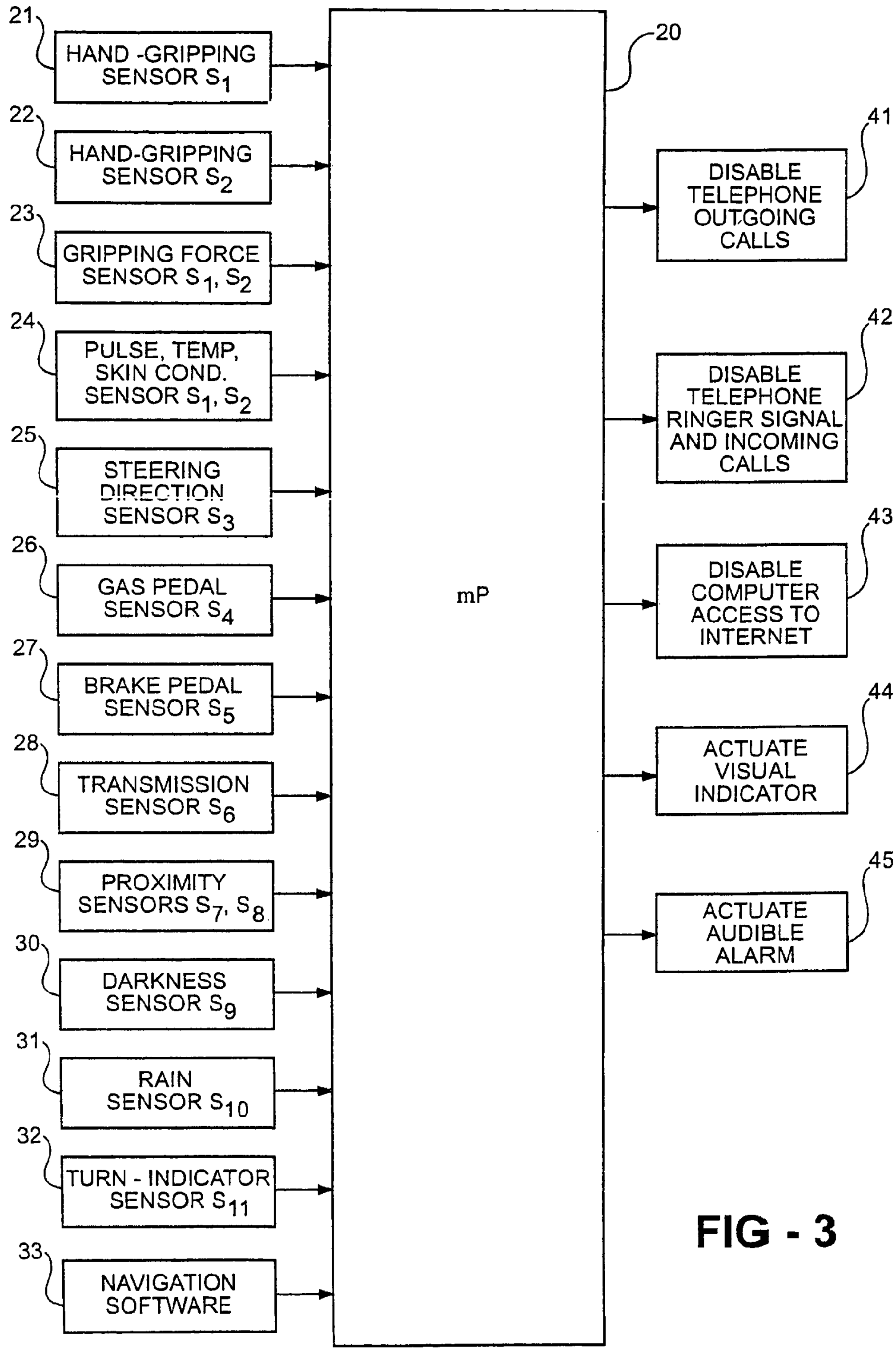


FIG - 2





21
HAND -GRIPPING SENSOR S_1
22
HAND-GRIPPING SENSOR S_2
23
GRIPPING FORCE SENSOR S_1, S_2
24
PULSE, TEMP, SKIN COND. SENSOR S_1, S_2
25
STEERING DIRECTION SENSOR S_3
26
GAS PEDAL SENSOR S_4
27
BRAKE PEDAL SENSOR S_5
28
TRANSMISSION SENSOR S_6
29
PROXIMITY SENSORS S_7, S_8
30
DARKNESS SENSOR S_9
31
RAIN SENSOR S_{10}
32
TURN - INDICATOR SENSOR S_{11}
33
NAVIGATION SOFTWARE
mP
20
41
DISABLE TELEPHONE OUTGOING CALLS
42
DISABLE TELEPHONE RINGER SIGNAL AND INCOMING CALLS
43
DISABLE COMPUTER ACCESS TO INTERNET
44
ACTUATE VISUAL INDICATOR
45
ACTUATE AUDIBLE ALARM

FIG - 3

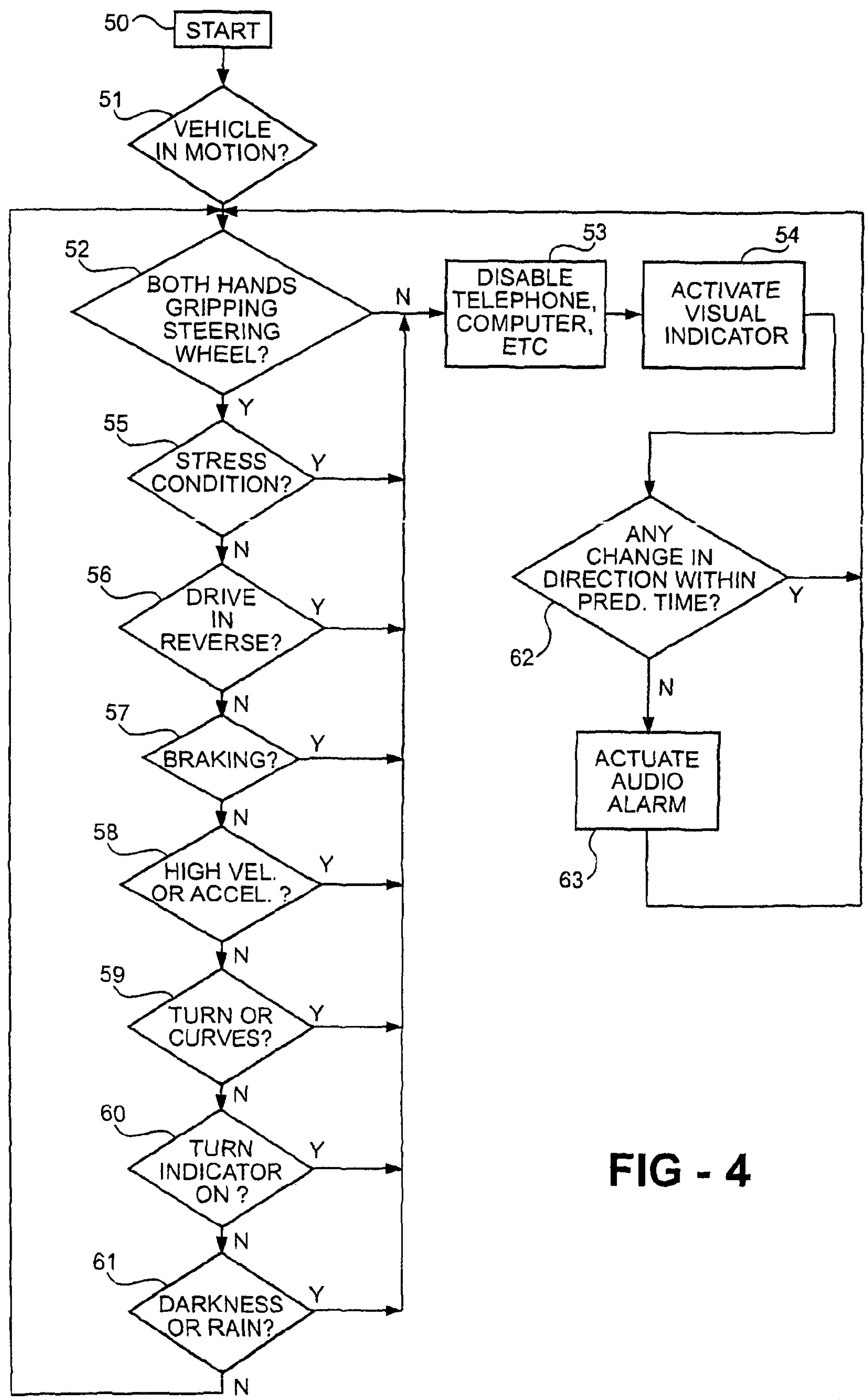
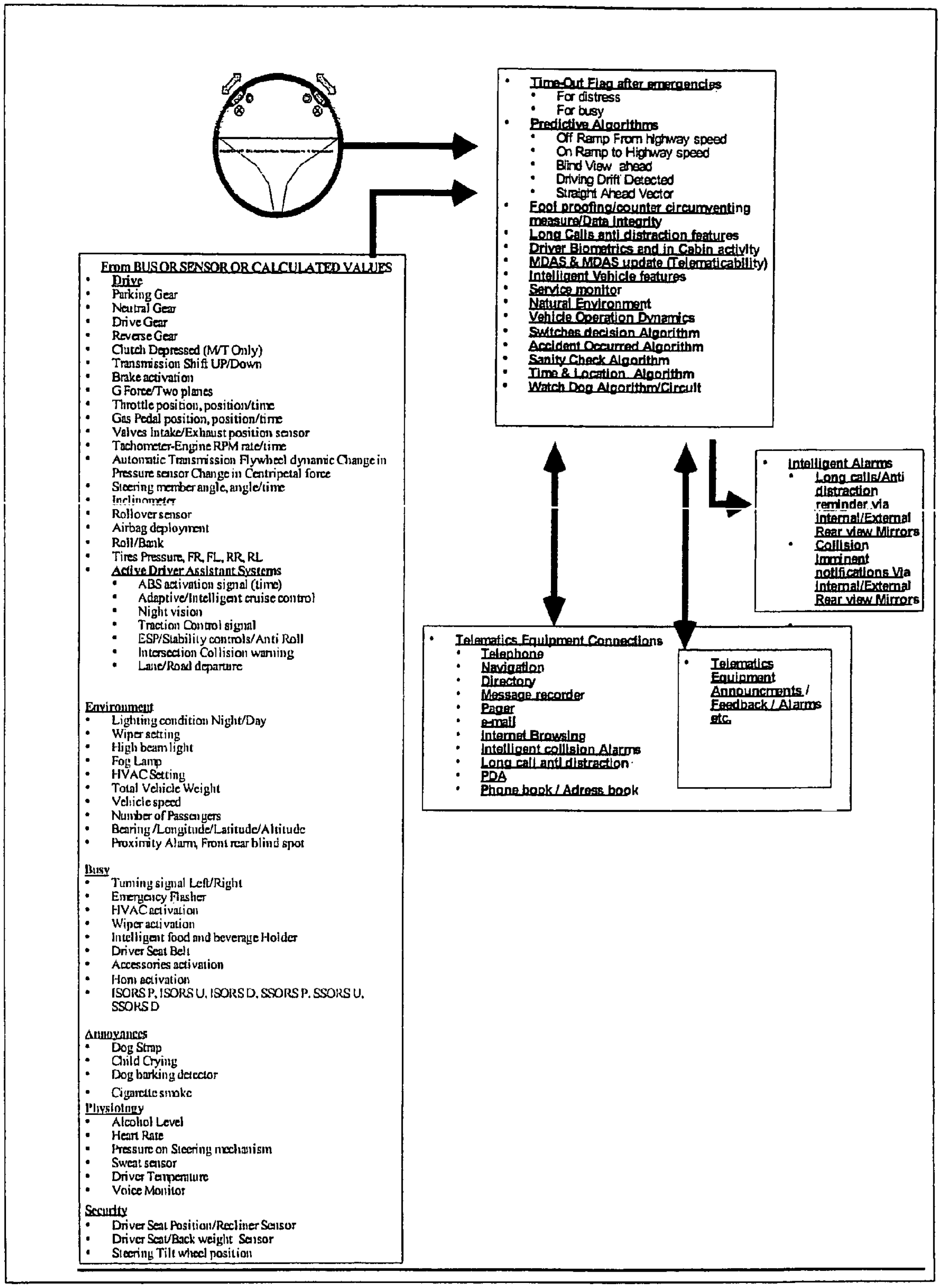

50
START
51
VEHICLE IN MOTION?
52
BOTH HANDS GRIPPING STEERING WHEEL?
N
53
DISABLE TELEPHONE, COMPUTER, ETC
54
ACTIVATE VISUAL INDICATOR
Y
55
STRESS CONDITION?
Y
N
56
DRIVE IN REVERSE?
Y
N
57
BRAKING?
Y
N
58
HIGH VEL. OR ACCEL. ?
Y
N
59
TURN OR CURVES?
Y
N
60
TURN INDICATOR ON ?
Y
N
61
DARKNESS OR RAIN?
Y
N
62
ANY CHANGE IN DIRECTION WITHIN PRED. TIME?
Y
N
63
ACTUATE AUDIO ALARM

FIG - 4

FIGURE 5



FORD EX. 1001, p. 7

SAFETY CONTROL SYSTEM FOR VEHICLES

REFERENCE TO CO-PENDING APPLICATIONS

The present application is a continuation of U.S. patent application Ser. No. 10/287,299, filed Nov. 4, 2002 now U.S. Pat. No. 6,731,925, which claims the benefit of an priority from U.S. patent application Ser. No. 10/279,447, filed Oct. 24, 2002, Provisional Application No. 60/336,293 filed Oct. 24, 2001, and Provisional Application No. 60/390,877 filed Jun. 21, 2002, the contents of which are incorporated herein by reference.

FIELD OF THE INVENTION

The present invention relates to the field of telematics, namely to the field of integrating information, communication, computing and entertainment technologies into vehicles for civilian or military use. The invention particularly relates to safety control systems for vehicles to reduce driver distraction, avoiding potentially dangerous conditions tending to produce accidents.

BACKGROUND OF THE INVENTION

One potentially dangerous condition is the use of a vehicle telephone by the vehicle driver while driving the vehicle. The use of telematics in general and particularly cellular telephones by drivers while driving has been found to increase the possibility of an accident since such a telephone not only diverts the driver's attention from driving, but also generally requires the use of at least one of the driver's hands and distract the driver's eyes from the road and traffic. In fact, many states and countries have enacted legislation requiring that telephones used in vehicles by drivers while driving must be of the "hands free" type and usually telematics equipment carries a warning to educate and discourage the driver about the risk of using these devices while driving. However, such legislation is difficult to enforce and education is not usually effective in assuring driver compliance. Moreover, even where the vehicle is equipped with a "hands free" telephone, drivers nevertheless still frequently use one hand for holding or dialing the telephone. When one hand is occupied by holding a telephone, the danger of causing an accident in an emergency situation is increased because of the additional reaction time required to properly grip the steering wheel with both hands. Similar danger exists when the driver attempts to control audio and video equipment, e.g. Radio, Music CD, DVD, Books on tape etc., or when the driver attempts to change environmental controls like adjusting the heat or air conditioning, or other vehicle settings.

There are other potentially dangerous conditions and inherent risks in driving that depends on the driving act itself, such as rapidly accelerating or decelerating, excessive maneuvering, merging to or exiting a freeway, passing, changing lanes, changing gears, depressing the clutch, driving at high speed, negotiating a turn, braking, reverse-driving, or a stress condition on the part of the driver, that could increase the possibility of an accident should the driver be distracted by activation of the telephone or other signal or device. This inherent risk is also dependent on the driving purpose as well, for example, the risk in driving a police cruiser is inherently riskier then in driving a sedan, and driving a delivery van has different risk than driving the family van.

Herbert et al., U.S. Pat. No. 6,188,315 and Brown, U.S. Pat. No. 6,353,778, disclose systems for avoiding preset potentially dangerous conditions while operating a vehicle having a vehicle telephone, but the systems described in those patents are of relatively limited application, and do not provide for avoiding dangerous conditions or to managing risk and individualizing the warnings to individual driving skills or application and to combinations of events and environmental conditions.

SUMMARY OF THE INVENTION

An object of at least some presently preferred embodiments of the present invention is to provide a safety control system for vehicles tending to reduce the possibility of accidents in one or more of the above respects. Another object of at least some presently preferred embodiments of the invention is to provide a method of reducing or avoiding driver distraction during potentially dangerous conditions encountered while operating a vehicle.

According to one aspect of one embodiment of the present invention, a safety control system for vehicles, includes, a communication device having at least one of an input accessible from within the vehicle and an output communicated within the vehicle, at least one sensor operable to sense at least one condition related to vehicle operation, and a controller communicated with the sensor and the communication device to selectively suppress at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold. When an input is suppressed, the driver is prevented from accessing or inputting information into the communication device. When an output is suppressed, communication between the device and the driver of a vehicle is suppressed to, among other things, avoid distracting the driver during certain driving situations or conditions.

According to one aspect of one embodiment of the present invention, there is provided a safety control system for vehicles including a telephone or other input or output device and one or more sensors for sensing instantaneous driver stimuli and/or a potentially dangerous condition and for automatically disabling or suppressing the telephone or other input or output device when sensing such stimuli and condition. In one form, the sensors include two sensors mounted on a steering member to provide an indication of the presence of the driver's hands on the vehicle steering member, and effective to suspend use of the telephone or other input/output device when the two hands of the driver are not sensed as present on the steering member while the vehicle is in motion. This system is modular, dynamic, interactive, and adaptive to each individualized user. In one implementation, the invention employs a method for automated machine prioritizing to provide assistance to the to driver and optimize the functionality of telematics features accessibility by arranging them according to a user's needs and preferences based on usage frequency of individual features and/or application or as customized individually by the user preferences, skills and events. In another embodiment, sensors on a steering member are used to measure changes in driver physiology. Other methods can be used for sensing driver physiology, e.g. via infrared detection, camera and image/color recognition etc.

Smart Speaker: Incoming calls are routed to a speaker that reflects and bounce sounds of front windshield at driver Look Ahead, Eye Level. Or simulate such action so that a driver focuses or has his/her attention directed toward the windshield just like he would do if he is carrying a conversation with another person.

According to further aspects in the described preferred embodiment, the steering member is a steering wheel, and the

sensors include two sensors on opposite sides of the steering wheel located to sense the presence of the driver's hands on the steering wheel. Preferably, the two sensors are located approximately on or between the "two" and "ten" and the "three" and "nine" clock positions of the steering wheel.

It will thus be seen that such a system, requiring both hands to be on the steering wheel in order for the driver to operate the input/output devices, not only requires the vehicle to be equipped with a "hands free" interface for the input/output devices, or a system that can be used as such with an adapter or when docked to the system gateway, but also enforces the use of the "hands free" feature by sensing that the driver actually has both hands placed on the steering member before the input/output devices can be operated accessed or displayed to the driver. Disabling the operation of the device would preferably include not only disabling making outgoing and receiving incoming telephone calls, but also disabling the signal (typically audible tones, vibrations, or visible light) of an incoming call, fax, e-mail, the display of non-urgent vehicle status or warning indicators, since such signals, indicators or displays can distract the driver. Such distractions are problematic at times and conditions wherein operation of the vehicle requires more than usual driver attention and interaction, or when other distractions are already present for the driver.

According to further features in the described preferred embodiment, the vehicle may also include a computer or the driver may also use a portable multi-function telematics device in the vehicle allowing access to the Internet or other network for transmitting and/or receiving faxes or e-mail or browsing the web or accessing a WAN, with the sensors also disabling driver initiated access to such devices when the two hands of the driver are not sensed on the steering member while the vehicle is in motion.

In most cases, the steering member would be a steering wheel as presently included in conventional vehicles. However, in certain applications the steering member could be a joystick, or other type of steering member. In such case, the sensors are placed in areas a driver is recommended or required to grip the steering member to safely control the vehicle.

According to further optional features in the preferred embodiment of the invention described below, the sensors may further include devices for sensing vehicle acceleration, deceleration, merging onto or exiting a freeway, passing, changing lanes, changing gears, depressing the clutch, a reverse-drive condition of the vehicle, the braking of the vehicle, the undue proximity of the vehicle to another vehicle, excessive maneuvering, and/or an unduly high velocity of the vehicle, any one of which conditions, or combination of conditions, may also be effective to disable the operation of the telephone, computer, or other potentially distracting equipment, display or indicator within the vehicle.

According to still further optional features in the preferred embodiment of the invention described below, at least one of the sensors on the steering member also senses a physiological condition of the driver and disables the input/output devices when a predetermined physiological condition is sensed. For example, the physiological conditions sensed could be a predetermined gripping force applied by a hand of the driver while gripping the steering wheel, or a predetermined pulse rate, temperature, blood pressure, blood oxygen level, and/or skin conductivity of the driver. Such physiological conditions may indicate a stress condition of the driver and, when sensed, can lead to disabling or suppressing operation of the input/output devices to avoid aggravating the stressed condition.

The system may also sense a drowsiness condition of the vehicle operator. For example, the system may include a steering direction sensor that actuates a drowsiness alarm when sensing a failure to change the steering direction within a predetermined time, distance interval while accounting for vehicle speed in indicating a possible drowsiness condition in the driver. Additionally, such sensor when monitored with respect to changes over time will indicate jerk reaction, which indicates that the driver was not paying attention and the system will temporarily suspend all telematics to give the driver a chance to recover. Another application for such a sensor is the monitoring of an OFF Zero angle for an extended period of time/distance which can indicate a blind curve or hard curve, and again, here the system will temporarily suspend the telematics and/or input/output devices from interacting with the driver, and vice versa, until normal driving functions are restored.

According to another aspect of the present invention, there is provided a method of avoiding potentially dangerous conditions while operating a vehicle having an input/output device and a steering mechanism including a steering member to be manipulated by the driver, comprising: providing the steering member with two sensors for sensing the presence on the steering member of the two hands of the driver; and disabling the input/output device when the two sensors fail to sense the presence on the steering member of both hands of the driver while the vehicle is in motion.

According to further features in the described preferred embodiment, the input/output devices may also be disabled when the vehicle is traveling in the reverse direction, or is being braked, or is within a predetermined proximity of another vehicle, or is traveling at a high velocity, accelerating, decelerating, merging onto or exiting a freeway, passing, changing lanes, changing gears, depressing the clutch, or a driver is occupied using other accessories in the vehicle or otherwise distracted. Since a high degree of attention of the driver is required under all the foregoing conditions, operation of the vehicle telephone, for example, even the ringing signal of an incoming telephone call, could be highly distracting to the driver and is therefore disabled to avoid the possibility of increasing the risk of an accident.

To assure that the driver and the vehicle as well as on board communication devices as described above are working harmoniously together, one presently preferred embodiment of the system includes the following

The Driving Systems, (Man, Machine, Environment, Regulation, and History)
- Man: the driver, the passengers, the pedestrians, society;
- Machine: the car, the telematics, the infrastructure;
- Environment: the driving environment (in the car and outside the car and the infrastructure used)
- History: the personal driving experience, the equipment maintenance history
- Regulation: the existing laws and common safe driving etiquette into, society and the infrastructure regulation.

All of these elements will be harmonized by the system as it isolates the drivers from non driving related distractions and helps them comply with driving related laws and etiquette via reminders and passive assistance.

Further features and advantages of at least some of the embodiments or implementations of the invention will be apparent from the description below.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects, features and advantages of the present invention will be apparent from the following detailed

description of the preferred embodiments and best mode, appended claims and accompanying drawings in which:

FIG. **1** schematically illustrates one form of a safety control system for vehicles constructed in accordance with the present invention;

FIG. **2** is an enlarged view illustrating the steering wheel in the vehicle of FIG. **1** and the sensors mounted thereon;

FIG. **3** is a block diagram illustrating the main components in the system of FIG. **1**;

FIG. **4** is a flowchart illustrating the operation of the system of FIG. **1**; and

FIG. **5** is a block diagram illustrating the nature and the flow of signals and algorithms used in one presently preferred embodiment of the system of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. **1** schematically illustrates a vehicle, generally designated **2**, equipped with a control system for sensing a variety of risk factors and potentially dangerous conditions and for automatically executing various responses when sensing such conditions in order to avoid hazardous situations tending to increase the possibility of an accident. One response is the disabling or suppression of one or more input or output devices to avoid interaction between the devices and the driver in certain situations and conditions. Another response includes providing a signal to or requiring the driver to take some action to increase driver alertness and/or awareness.

One example of a hazardous situation avoided by the control system illustrated in FIG. **1** is the use of the vehicle telephone in certain situations wherein a making of a telephone call by the vehicle driver, or the receiving of an incoming call, particularly the ringing of such a call, may distract the driver and increase the possibility of an accident when the driver is in a high-risk driving situation. Similar increased risk can result from the driver changing vehicle controls like temperature settings, or interacting (e.g. inputting or receiving output) with other telematics such as e-mail, radio, CD, DVD, navigation system, incoming page or the like. In such cases, the vehicle telephone, other telematics and/or other input/output devices are suppressed and no incoming or outgoing signals are allowed to distract the driver. In case the driver is the party initiating the telematics, a visual indicator and audio feedback can be activated to indicate to the driver that telematics is disabled, supply reason therefore, and even recommend driving modification to enable telematics. Another condition sensed by the system is undue stress in the driver, as indicated by the sensed pulse rate, temperature, blood pressure, skin conductivity (e.g. perspiration), loud voice(s) or stressful sounds in the cabin, such as baby crying, dog barking etc., any combination of one or more of which conditions would also disable incoming telematics. A further condition sensed by the system is the possibility of drowsiness on the part of the driver, in which case an audio alarm would be activated to alert the driver to this condition. Examples without limitation of other alarms to overcome driver drowsiness include vibration in the seat, changing HVAC temperature settings and blower speed to extremes, change of seat position, radio volume or station, CD-track etc. The system will restore operation of the input/output devices when conditions are normalized and will notify driver of all missed activities.

Vehicle **2** illustrated in FIG. **1** is a conventional vehicle including a steering mechanism, generally designated **3**, having a steering wheel **4**, a propulsion device such as a motor or engine **5** for driving the vehicle via a transmission or other torque converting means schematically indicated **6**, an acceleration pedal **7**, and a braking pedal **8** for controlling the vehicle. Vehicle **2** further includes one or more visual indicator and audio alarms **9**, e.g. mounted within the forward-look ahead viewing or hearing by the driver.

FIG. **1** further schematically illustrates a cellular telephone **10** within the vehicle, and a computer **11** or other multifunction telematic device allowing access to the Internet for transmitting and/or receiving faxes or e-mail, WAN and Web access, or other input/output device. Other input/output devices include vehicle fault/warning lights (battery, temperature, washer fluid, etc.) or other signal or alarm (open door, low fuel level, seat belt monitor, etc.). Vehicle **2** illustrated in FIG. **1** may also include many other components conventionally provided on vehicles at the present time or to be provided in the future.

The safety control system included in vehicle **2** illustrated in FIG. **1** includes a plurality of sensors for sensing various conditions with respect to the vehicle driver, the vehicle itself and/or the environment. These signals are collected via direct tapping to existing or added sensors or via vehicle bus and user specified values. These include sensors S**1** and S**2** applied to the steering wheel **4** of the vehicle; sensor S**3** applied to the steering mechanism **3** of the vehicle to sense changes in the steering direction and/or actuation of the turning indicator. The turning signal indicator switch/lever can also act as a blind spot collision avoidance actuator. When a driver actuates the turn signal indicator by moving the turning signal lever in advance of making a turn, subsequent momentary pull up or momentary push down on the lever will move the corresponding mirror further out to scan the vehicle blind spot.

Other sensors may include sensor S**4** sensing the condition of the gas pedal **7** and/or vehicle speed or acceleration; sensor S**5** sensing the condition of the braking pedal **8**; and sensor S**6** sensing the condition of the transmission or other type torque converter **6**.

Also schematically illustrated in FIG. **1** are sensors S**7** and S**8** carried to sense the proximity of the vehicle with respect to another vehicle; sensor S**9** sensing darkness or alternatively sensing the activation of the headlight; and sensor S**10** sensing weather conditions rain, sleet, snow, ice, temperature and/or sensing the activation of the front or rear wipers or headlight wipers.

As will be described more particularly below, the foregoing sensors (or signals) are generally effective only when the vehicle is moving to sense their respective conditions and to execute certain control functions in order to decrease the possibility of an accident. One important control function is to disable an incoming call from ringing the telephone **10**, and the computer or other telematics portable or built in **11** from accessing the Internet or announcing incoming signals, e.g. page, e-mail etc., and to indicate same by actuating a visual indicator and an audio feedback if a driver attempts to initiate telematics during an unsafe or a high risk condition, and may direct a driver to alternative driving habit to gain access to telematics. The system may also suppress delivery of unnecessary external signals such as certain vehicle warning lights or alarms, the system will restore function of the input/output devices when conditions are normalized and will notify driver of all missed activities. In some cases, such as where a drowsiness condition is sensed, an audio alarm **9** is actuated. Other possible alarms to overcome driver drowsiness would include vibration in the seat, changing HVAC temperature settings and blower speed to extremes, etc.

FIG. **2** more particularly illustrates the sensors S**1**, S**2** mounted on the steering wheel **4**. As shown in FIG. **2**, the two sensors are mounted on or between the “two” and “ten” and

the "three" and "nine" clock positions of the steering wheel **4**; the "two" and "ten" positions are considered to be the most preferred ones for the two hands of the driver in order to manipulate the steering wheel, but other positions could be employed, such as "nine and fifteen", which provide more clearance for activated airbags. The two sensors S**1**, S**2** thus sense the proper positioning of the two hands of the driver on the steering wheel **4**.

The two sensors S**1**, S**2**, which may be attached to or embedded in the steering wheel, may be simple electrical switches that are actuated by the respective hand of the driver when properly placed on the steering wheel.

Preferably, however, one or both of the sensors S**1**, S**2** or other sensors are also capable of sensing a physiological condition of the driver, such as the gripping force applied by the driver's hand, or the pulse rate, blood pressure, blood oxygen level, temperature and/or electrical skin conductivity of the driver's hand while gripping the steering wheel. For example, sensor S**1** could include a transducer for converting pressure to an electrical signal, such as a spring-type, carbon-type transducer, optical type or semiconductor type. Sensor S**2** could include one or more transducers, such as known in finger probes, for sensing pulse rate, temperature, and/or electrical skin conductivity, and for outputting an electrical signal corresponding to the magnitude of the sensed condition, as described for example in U.S. Pat. Nos. 6,319,205; 5,438,986; 5,065,749; 4,860,759; 6,415,176 or 5,897,505, the contents of which are incorporated herein by reference.

As will be described more particularly below, sensors S**1** and S**2** thus sense that both driver's hands are present on both sides of the steering wheel **4** to enable operation of the telephone **10** and the computer **11** or similar multi-function or standalone telematics or other devices. Thus, the telephone **10** can be permitting "hands free operation" or a telephone/telematics system that can be used as such with an adapter or when docked to the system gateway, as required by-many laws to avoid accidents, but also the driver is permitted to use the telephone only in a "hands free" manner, thereby precluding the driver from gripping a telephone to operate it even though the telephone or the telematics system may have a "hands free" capability. While the presently preferred implementation requires actuation of both sensors S**1** and S**2**, the system could be modified to permit use with only one sensor. This will permit use by drivers having only one hand. Requiring presence of at least one hand on the steering member **3** reduces the likelihood of unintended system activation such as may occur, for example, with voice activated systems that can be activated by any sound within a given range or frequency.

In addition, by providing sensor S**1** and/or sensor S**2** with the capability of sensing a physiological condition of the driver while gripping the steering wheel, other conditions can be sensed to disable the telephone for further reducing the possibility of an accident. For example, the gripping force applied by one or both hands of the driver may indicate a stress condition of the driver. A stressed condition may be also indicated by the sensed pulse rate, temperature and/or electrical skin conductivity (the latter indicating perspiration) of the driver. If a stress condition is sensed, the telephone **10** is disabled so as to decrease the possibility that the ringing noise of an incoming telephone call will so distract the stressed driver as to create a hazardous condition, or that the making of an outgoing call by the driver will be so distracting to the stressed driver as to create a hazardous condition. Whereas as a matter of standard all alarms are designed to attract attention, e.g. buzzers, ringers, flashing lights, etc., all of these alarms are muted by the gateway and the gateway will communicate all alarms and notification to the driver via driver selected method, e.g. visual, audio or both.

The provision of a grip sensor on the steering wheel also enables the system to sense drowsiness or dozing of the driver, as in U.S. Pat. No. 4,485,375, incorporated herein by reference. Thus, if the gripping force sensed by sensor S**1** and/or sensor S**2** drops while the vehicle is in motion, this could indicate a drowsiness condition. If such a condition is sensed, the audio alarm **9**, which may be a separate alarm or a radio volume control or hvac blower and temperature control, or alternatively a vibrator, may be activated, together with a visual indicator in an attempt to arouse the driver and to alert the driver to the drowsiness condition. When drowsiness is sensed, the telephone **10** would not be disabled since the ringing of an incoming call may be further effective to arouse the driver. Other alarms to overcome driver drowsiness would include vibration in the seat, changing HVAC temperature settings and/or blower speed to extremes, etc.

The sensors S**1** and S**2** are preferably located at the ten o'clock and two o'clock positions but may be alternatively located in other positions such as the nine o'clock and three o'clock positions. The mechanisms of the switch include, by way of examples without limitation, mechanical, optical or resistive sensors or switches, a jog dial or switch (e.g. of the type that can be rotated to scroll amongst choices and depressed to select a choice), slide switch and a rocker switch. The sensors can be arranged to be actuated either in the thumbs-up position or the thumbs-down position. The sensors are tested for integrity by the microprocessor **20** during start up and are designed to reduce the likelihood of accidental activation. Preferably, the integrity check determines if the switches can be activated and deactivated to ensure that the switches are not stuck in one state. The switches may become stuck unintentionally, or may be purposefully placed in the activated state to override the safety switches and permit actuation of the control system without having one or both hands present on the steering member. The detection of failed switches will cause the microprocessor to block operation of the system. Hence, the integrity check prevents a user from effectively overriding the safety switches to ensure that use of the control system occurs only when the drivers hand or hands are present on the steering member **3**.

Sensor S**3** is coupled to the steering mechanism **3** so as to sense changes in the steering direction. For example, an alert driver constantly makes minor changes in the steering direction automatically, but not so with respect to a drowsy or dozing driver. Accordingly, if sensor S**3** fails to sense a change in the steering direction within a predetermined time interval, this would indicate a possible drowsiness condition in the driver, and therefore the audio alarm **9** would be activated in an attempt to arouse the driver and alert him to that condition.

Sensor S**4** senses the depression of the gas pedal **7**, and/or vehicle speed or acceleration sensor S**5** senses the depression of the brake pedal **8**, and sensor S**6** senses the condition of the transmission **6** and/or also the velocity of the vehicle. For example, if the transmission is in reverse gear, the driver should not be distracted by receiving or making a telephone call, or by other devices or signals and therefore these things should be disabled. If desired, the same could apply in any gear other than the normal drive gear. Also, if the vehicle is moving at a relatively high velocity, is rapidly accelerating a decelerating, is engaged in turning or otherwise rapidly maneuvering, such that any unnecessary distraction of the driver should be avoided, the devices and signals could likewise be disabled.

Sensor S**7** mounted at the front of the vehicle senses its proximity to a vehicle ahead of it; sensor S**8** mounted at the rear of the vehicle senses the proximity of a vehicle behind it; sensor S**9** senses the darkness level of the road on which the vehicle is traveling (e.g., whether day or night, whether the road is brightly illuminated); sensor S**10** senses a rain condition; and sensor S**11** senses whether either of the turn indicators of the vehicle is operating to signal for a turn or a change of lanes.

The conditions sensed by sensors S**7**-S**11** are also such that a hazard may be produced if, during the existence of such a condition, the full attention of the driver would be diverted by the ringing of the telephone or by the use of the telephone for making an outgoing call. Accordingly, under such conditions, the telephone **10** is disabled from operation. Similarly, the computer **11**, if present, is disabled from operation to preclude access to the Internet for transmitting and/or receiving faxes or e-mail, which could also result in a similar distraction increasing the possibility of causing an accident. And further, other devices, including telematic devices, vehicle signals or alarms, and the like can be suppressed or disabled to avoid or limit distractions to the driver under certain conditions.

FIG. **3** is a block diagram schematically illustrating a microprocessor, generally designated **20**, included in the vehicle safety control system of FIG. **1**, together with its inputs schematically indicated by blocks **21**-**33**, and the outputs schematically indicated by blocks **41**-**45**.

Thus, as shown in FIG. **3**, microprocessor **20** includes inputs **21** and **22** from the steering wheel sensors S**1**, S**2**, to indicate whether driver's hands are on the steering wheel. Microprocessor **20** further includes an input **23** indicating the gripping force applied by one or both of the hands to the sensors S**1**, S**2**, and an input **24**, also from one or both of the sensors S**1**, S**2**, indicating the heart pulse rate, skin conductivity, temperature, blood pressure, blood oxygen level, and/or other physiological condition of the driver having a bearing on proneness of the driver to accidents or instantaneous driver stress level or general physical well-being. As indicated earlier, these inputs indicate particularly whether the driver is in a stressed condition, drowsy, or in an alternate embodiment, when an optional breath alcohol sensor is activated. In addition to or in place of the sensors S**1** and S**2**, the physiological conditions can be monitored by other sensors mounted elsewhere in the vehicle including on other locations or the entire surface area of the steering wheel. These sensors may be actuated by direct contact with the driver, or by infra red (for example, to sense increased body temperature and the like), or camera (for example, to sense increased driver agitation, flushed facial appearance, by way of examples without limitation).

Another input into microprocessor **20** is from the steering direction sensor S**3**, as indicated by block **25**. This input is helpful in indicating the alertness of the driver, particularly whether the driver may be in a drowsy or even a dozing state, which would be indicated if this input shows no change in the steering direction within a predetermined period of time. The sensor S**3** can also determine rate of change of steering direction, and can provide information used to suppress driver distraction signals when the vehicle is turning sharply, negotiating a long curve that may be blind or of limited sight distance, or during a slalom maneuver.

Another input to the microprocessor would be from a sensor associated with the vehicle cup holder to indicate when a cup which was initially disposed in the holder has been removed, as for drinking. The sensor might include a weight indicator to determine whether the cup was empty when lifted or a temperature sensor to sense heated beverages. This sensor may also sense food on a food tray or elsewhere in the vehicle.

Further inputs into microprocessor **20** include signals from the gas pedal sensor S**4** to indicate high acceleration (block **26**); the braking pedal sensor S**5** to indicate braking (block **27**); the transmission sensor S**6** to indicate high vehicle speed or reverse drive (block **28**); the proximity sensors S**7**, S**8** at the opposite ends of the vehicle to indicate the proximity of the vehicle to other vehicles (block **29**); the darkness sensor S**9** (block **30**); the weather sensor S**10** (block **31**); and turn-indicator sensors S**11** (block **32**), and other sensors such as vehicle speed.

FIG. **3** illustrates a further input from navigation software (block **33**) with which the vehicle may be equipped in order to assist the driver in navigating the vehicle to various desired locations. For example, the navigation software could be pre-programmed to output a signal to microprocessor **20** at certain locations, such as at heavily-trafficked roads, intersections, bridges, tunnels, etc., where the full concentration of the driver is sufficiently critical to avoid distractions as may be caused by a telephone call or other communication to or initiated from the driver. The system could also provide an alarm to the driver indicating an approaching obstacle or condition that will require the driver's attention, including sharp turns, traffic-jams, intersections, bridges, tunnels, railroad crossings, school zones, traffic lights, construction zones, etc. Such locations could also be programmed by the driver by inputting a place mark when such an obstacle or condition is encountered as a reminder to the driver the next time that obstacle or condition is approaching or encountered. Place marks can be automatically applied by the system when certain threshold conditions are met, for example without limitation, unusual steering or swerving, hard braking or deceleration, and the like. Such place marks can be indicative of "near misses" and may represent areas or locations where the driver needs added caution. Any of the place marks can be incorporated or ignored by the driver as they are made, or at any time thereafter, according to the preferences or profile of the driver. The driver can also set as a preference what criteria the system uses for automatic place marks, or if such place marks are generated at all.

It will be appreciated that other sensors could be provided as inputs into microprocessor **20** wherein similar conditions may occur, either on the part of the driver, the vehicle, and/or the environment, in which, for purposes of safety, external distractions are to be avoided such as may be caused by making or receiving a telephone call, or being alerted by a vehicle signal or alarm, or by any other input/output device.

In the preferred embodiment of the invention, the microprocessor **20**, among other functions, acts as a "state machine" to define, arrange and prioritize features and functionalities of the system. In other applications this function can be performed by standalone which interconnects with a microprocessor **20**. The state machine aspect of the microprocessor may make telematic control decisions on a variety

of criteria such as: (a) the frequency of use of the application, the frequency in which a number, e-mail or URL is contacted; (b) based on safety/urgency priorities, e.g. cruise or CD changer, cell messages or other telematics, or music played on the radio; (c) as preset by the operator; (d) optionally, based on other collected information from the driving system, the microprocessor will initiate calls at predetermined times out of voice mail as, for example, when the driver completes backing out of a driveway and begins a trip. More frequently used applications can be placed higher in the order of applications than others so they can be more quickly and easily accessed, thereby reducing driver involvement in selecting and activating such applications. Further, active applications or most recently used applications can be placed higher in the order of applications so that they can be more quickly and easily accessed. And priority can be given to driving related features or controls over convenience or communication based controls. For example without limitation, if the vehicle cruise control system is active, the first application made available to the driver upon actuation of the control system is preferably the cruise control so that the driver can make any changes to the current cruise control settings, preferably by toggling through and selecting various options/features/settings with the safety switches on the steering wheel. Similarly, if an incoming telematic communication is announced by the system and the system determines it safe to inform driver of such communication, such communication is immediately available for the driver, even if such communication is normally low on the driver priority level.

The user provides signals to the state machine to block features or incoming telematics based on ID, location of phone numbers, e-mail addresses or URL. The blocked or stored telematics will be announced to the driver or stored for use in controlling the system in the future.

The state machine employs an assessment of the incoming calls and places them in categories such as: (a) likely and/or known to cause distraction and accidents; (b) likely but not known to cause distraction and accidents; (c) may cause distraction or accidents; (d) not likely and not known to cause distraction and accidents. These categories will be used to determine the effect of the incoming signals on the telematic system in accordance with the following Table 1:

TABLE 1

Device/Feature assessment.
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Categories		Rank			
	Effect	A	B	C	D
1	Likely AND/OR Known to cause distraction AND accidents	X	?	?	?
2	Likely BUT NOT Known to cause distraction AND accidents	?	X	?	?
3	May Cause distraction or accident	?	?	X	?
4	NOT Likely AND NOT Known to cause distraction AND Accident	?	?	?	X

Application usage Assessment

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01-clearly separating what's:	1a-Importantfor safe driving	Class A
	1a.1-Subject Vehicle	Class A-S
	1a.2-Other Vehicles	Class A-O
	1b-Improtant to drivers	Class B
	1c-"Nice to Have" for drivers	Class C
	1d-"Important/Nice to Have" for passengers	Class D
User interface requirement Assessment Copyright ® 1987-2002		
02-Assuring driver intent		Class A
03: Simplicity		Class A
04: Accessibility		Class A
05: High Availability		Class B
06: Universality		Class B
Self customization/individualization requirement Assessment		
07: Portability		Class B
08: adaptive		Class A
09: Privacy		Class B
Owner requirement Assessment		
10: cost		Class C
11: Interchangeability		Class A

Classification A B or C Need to be Addressed. D Can be Totally Ignored.

The outputs from microprocessor **20** include control signals as shown by the following blocks: block **41**, effective to disable the telephone or other telematics from making outgoing calls; block **42**, effective to disable the telephone or other telematics from receiving incoming calls and from actuating the ringing signal; block **43**, effective to disable the computer, if provided, from accessing the Internet to make or receive e-mail, faxes, etc. or to disable any other signal to be otherwise communicated to the driver; block **44**, effective to actuate a visual indicator viewable by the driver; and block **45**, effective to actuate an audible alarm.

These blocks are representative of a wide range of outputs that may be utilized. For example, while block **41** is nominally listed as disabling outgoing telephone calls, the system may disable (via output **41** or some other output) all commu-

nications or input devices to prevent the driver from inputting or initiating activities or communications from them. In addition to disabling incoming telephone calls, output **42** or some other output can disable the output of any or all input/output devices to prevent communication to the driver of the particular output signals from these devices. Hence, the system may disable or suppress the output alarms or signals of a computer, PDA, pager, navigation system, and vehicle alarms or fault indicators (e.g. low fuel level, low washer fluid level, open door, unfastened seat belt indicators, etc). The outputs **44**,**45** nominally set forth as actuating visual or audible alarms, can also be used to actuate one or more mechanisms within the vehicle. For example, without limitation, the outputs **44**,**45** or other output(s) may be operable to move one or more rear view mirrors on the vehicle under certain conditions to change the field of view of the mirrors and aid the driver in maneuvering the vehicle, such as during a lane change at vehicle speed.

Outputs **44** and **45** can activate visual and/or audible alarms to draw the driver's attention to desired locations in the vehicle. This may be useful, for example, to draw the driver's attention to the rear-view mirror within the vehicle when a vehicle behind the driver's vehicle is sensed as being too close to the driver's vehicle for the relative speeds of the vehicles. Here, flashing a light or activating some other visible or audible alarm causing the driver to look in the rear-view mirror can aid the driver in avoiding a potential rear-end collision. Similar lights or alarms can be activated on or adjacent to the outside rear-view mirrors to draw the driver's attention to a particular side of the car. In this latter example, activation of a turn-signal indicating the driver is going to turn in one direction or switch lanes in that direction, may cause a visual alarm to be activated if a vehicle is sensed in sufficiently close proximity to the driver's vehicle in the generally intended direction of travel. In this scenario, the outside rear-view mirror may also be moved automatically by the system to change the field of vision the driver has through that mirror and thereby locate any vehicles in the "blind spot" of that mirror prior to its adjustment.

Additionally, the visual, audible, tactile or other alarms may be activated to increase the driver's attention and/or alertness during certain situations. A drowsy driver may be aroused or have his road alertness increased by flashing or otherwise illuminated or activated (e.g. audible or tactile) alarms. One widely available audible alarm includes the vehicle radio wherein the system can change the volume of the radio to arouse a drowsy driver. A driver engaged in a lengthy telephone conversation, or a lengthy internet usage session, or other lengthy communication session, may become overly focused on the communication and less focused on driving. In such situations, at least some people become focused straight forward, and lack awareness of the peripheral environment, exhibiting so-called "tunnel vision." Activating visual or audible alarms can cause the driver to look away from straight ahead and thereby increase the driver's awareness of the surrounding environment. The output signals may interrupt or override conflicting signals (e.g. audible signals may override the radio) unless the conflicting signals are safety related, or doing so is likely to increase driver distraction. The output signals are preferably adjusted automatically to overcome existing environmental conditions. For example, audible output signals may be louder if the noise level detected within the vehicle is high (e.g. wind noise from a window rolled down), and visual signals may be adjusted in intensity to better accommodate night or daytime viewing.

Operation

FIG. **4** is a flowchart illustrating an example of the operation of the system of FIGS. **1-3**.

Thus, as shown in FIG. **4**, the control system is made operational when the vehicle is in motion (blocks **50**, **51**). When the vehicle is in motion, a microprocessor **20** outputs signals **41**, **42** and **43** (FIG. **3**) disabling the vehicle telephone, computer, etc. within the vehicle (block **53**), and also signal **44** actuating a visual indicator within the vehicle to indicate this condition (block **54**).

If, on the other hand, both hands of the driver are properly sensed on the steering wheel **4** so as to actuate the two sensors S**1**, S**2**, one or both of the sensors is used to sense a physiological condition of the driver that might indicate a stress condition (block **55**). For example, such a stress condition could be indicated by an unduly high gripping force applied by one or both of the hands of the driver to the steering wheel, or by an unduly high pulse rate of the driver or skin conductivity of the driver indicating a high degree of perspiration. If such a stress condition is indicated as being present, the telephone, computer, vehicle alarm or signal, etc. are also disabled (block **53**), and a visual indicator activated (block **54**) to indicate this condition.

Next, the system checks to determine the condition of the vehicle, e.g. whether the vehicle: is traveling in reverse, as indicated by sensor S**6** (block **56**); is being braked, as indicated by sensor S**5** (block **57**); is traveling at or over a predetermined high velocity or high acceleration, as indicated by sensor S**6** (block **58**); is executing a curve or turn, as indicated by steering mechanism sensor S**3** (block **59**); is about to execute a turn, as indicated by turn indicator sensor S**11** (block **60**), or is traveling in the dark or in the rain, as indicated by sensor S**9** or sensor S**10** (block **61**). If any of these conditions is sensed, the telephone and the Internet access by the computer are also disabled (block **53**), and a visual indicator is actuated to indicate this condition (block **54**).

As further shown in FIG. **4**, if while the vehicle is in motion no change in steering direction has been sensed within a predetermined time interval (block **62**), an audible, visual or other alarm or vibrator is also activated (block **63**) to alert the driver to a possible drowsiness or dozing condition. Other alarms to overcome driver drowsiness would include vibration in the seat, changing HVAC temperature settings and/or blower speed to extremes, etc.

If desired, a manual override switch can be provided to enable the driver to manually override any of these controls, preferably except for the control of block **52** assuring that both hands of the driver are properly received on the steering wheel.

Setup Scenario:

Driver set up a portable Telematic device such as a cell phone, blackberry, PDA, etc. with driver preferences:

(1) Control preferences, e.g. Hands always Vs Hands on for Telematics only, and/or both hands required on sensors S**1**, S**2** for duration of telematics usage, or both hands needed to initiate telematics, and only one hand required on one of S**1** and S**2** to continue use of telematics,

(2) Annoyance items: Baby crying, Dog barking, smokers in car etc.

(3) Telematics option: Preferred application to use, preferred priority system etc.

(4) Emergency and identifying information.

(5) A driver enters a vehicle

a. docks all electronic communication equipment, e.g. pager, cell phone, PDA, etc., to the control system wirelessly or physically, thus identifies him/herself to the vehicle

b. System mutes all Telematics but keeps them active

c. Driver initiates his/her trip.

Scenario One (Driver Initiated)

The driver wants to make a call, review pages, read e-mail, connect to the Internet, use navigation system, etc. (1) The driver will activate the safety switches by placing both hands on the designated areas of the steering wheel and then, after the system acknowledges safety switch activation by providing the driver with a beep or voice or visual feedback, the driver with his/her hand on the actuated safety switch will toggle through options with the toggle switch until he gets to a selection that is needed, then using the toggle switch will confirm selection and proceed with the desired action. This could be multiple layers of options and applications, and can be accomplished with one or both of the toggle switches as desired by the driver. The toggle switches preferably can be activated with the thumbs of the driver permitting the hands to remain on the steering wheel. The actuation of the toggle switches can be simplified by a common scheme known as thumb gesture interpretation where a thumbs up (usually indicated by moving a switch upwardly with the thumb or moving the thumb upwardly relative to a switch or sensor) means yes and a thumbs down (usually indicated by moving a switch downwardly with the thumb or moving the thumb downwardly relative to a switch or sensor) means no, such as pushing one or both of the toggle switches upwardly to accept a setting or available option, and pushing one or both toggle switches downwardly to reject a setting or available option. The options can be provided on a HUD or via voice. Even if devices can be activated by voice control, they still need to have the safety switch or switches depressed to ensure driver intention and not an erroneous sound from the radio or a passenger or a malfunction of devices.

During this time the driver's hands must remain at the 10 and 2 position (also called 10:10). The driver must maintain the steering wheel within a specific angle which is calculated based on the following inputs: (1) weather condition, (2) speed of vehicle, (3) proximity of vehicle to others (front/back), feedback from ABS, ESP, traction control, etc. This angle (for example) is about 30 degrees either side of zero if the speed is 40 mph, but it is less when the speed is higher and more when the speed is lower. The driver will also be allowed to temporarily take his hands off the 10:10 position to, for example, make a sharp turn but will have to put them back at 10:10 to continue the previous activity. This amount of time is again dependent on speed, weather, vehicle proximity to others and feedback from ABS, ESP and traction control. In addition to use of a telephone or other telematic device, the switches on the steering member **3** can also be used to control the radio, CD player, cruise control, and environmental settings in the vehicle such as the interior temperature, and blower and heat/AC settings. The switches can be further used to initiate an emergency phone call. In one implementation, an emergency phone call (e.g. dialing 911) can be placed by pushing both toggle buttons in one direction, such as upwardly, and holding them for a period of time. The emergency phone call may activate the phone, or may automatically send by e-mail, voice data or other method information relating to the vehicle position, any airbag deployment, fire or smoke in the vehicle, number of passengers, presence of dogs or other notable things, recent vehicle operational characteristics, and the like. A call to another phone number can be placed by pressing both toggle switches in the other direction and holding them for a desired time.

Scenario Two (Incoming)

Incoming information will be customized by the driver, in accordance with Table A, to select what he/she wants to receive and in what priority. Once incoming information is detected by the system, the system will go through a checklist to verify feedback from steering about position and about speed and ABS and ESP and traction control and weather condition. When all conditions are met, the system will announce the incoming information to the driver who will have to press the safety control switch and accept the communication by holding the toggle buttons momentarily up. While using the toggle switch to accept the incoming information, the remainder of the controls will be as per outgoing, including hands at 10:10.

It will thus be seen that the illustrated system is effective to disable the operation of the telephone, telematic, or other input/output device (and/or access to the Internet by a computer) within the vehicle when any of the above-described conditions is sensed, to thereby avoid a distraction which may cause accidents. The fact that both hands of the driver must be present on the steering wheel in order to enable the operation of the telephone (and/or computer, telematic or other devices) not only requires that the vehicle must be equipped with a "hands free" capability, but that the driver must actually use this "hands free" capability created by the system gateway in order to make or receive telephone calls or other telematics activities. In addition, other sensors could also be provided to disable a vehicle telephone or a multi-function telematics system or Internet access provided by a vehicle computer in response to other conditions, such as the detection within the vehicle of the sounds of an emergency siren in an approaching vehicle, a child crying within the vehicle, the driver handling of a drink or food item from a monitored cup holder or a monitored food tray, or the activities such as modifying the cabin temperature, changing the volume on the radio, extending the sun visor etc.

The monitoring of all such signals, sensors, data and conditions is done by a modular dynamic plug and play state machine that integrates, prioritizes, enables, blocks or mutes telematics application and telematics functionalities based on priorities determined by learning frequency and characteristics of use or by driver preset preferences.

Such machine may be a hardware based, a software embedded in a dedicated hardware or a software/protocol embedded in one or more telematic equipment and it may act as a node on a network of telematic equipment and the vehicle bus, or as a hub for all telematics and a gateway to the vehicle, or any combination of the above.

The state machine can allow driver to set their preferences on a portable telematics device such as a cellular phone, or a WAN, Web site or via a FTP and e-mail. Such set up can be transferred to the vehicle in use when the driver docks the cell phone or other portable telematics devices to the system gateway. The downloaded profile will be updated with driving skills, driver habits and geographical/time/date based notes added by the driver while driving. The updated profile will be uploaded back to the source when the vehicle comes to a final stop, or ongoing as driving is being carried out. Such data may be direct values and status or a statistical representation of a driving experience. Therefore, the driver profile, preferences, history and other relevant data can be transferred to other vehicles by subsequent use of the source within another vehicle. In this manner, the driver's information can be coupled with data particular to the subsequently used vehicle to create another matrix of condition and factor parameters

monitored and controlled in use of the vehicle. The information may be stored in any suitable form on any suitable device including on a telematic device (e.g. telephone, PDA, computer, and the like), on a disc, CD, magnetic drive or the like, on a portable digital storage device like those used with digital devices (e.g. compactflash cards, memory sticks, flash drives and the like). The information may also be transmitted to another source, for example, to an internet web space from where it can be later accessed and used as needed. Vehicle data or information may also be stored either on or in the same source as the driver information, or separately. The vehicle data may stay within the vehicle, or may be transmitted to another location. For example, certain vehicle data may be sent to the vehicle manufacturer or other source to provide information on the performance of the vehicle, consumer use habits, service history, and the like. It should be easy to control access to information stored or generated by the system without the need for a second party. Also, no real time data access is possible to second party without explicit/implicit authorization or high level of sophisticated technology. This protects a drivers profile and other information, including at least the emergency contact information and the like.

The preferences included by the driver will range from telematics management options, e.g. preset priorities or automatic based on learning by frequency of use, tags of time, location and physiology. Preset priorities will allow a driver to assign sequence of access to telematics and telematics functionalities or to block certain activities based on time of day or source of telematics or geography at will. Automatic based learning condition, on the other hand, for example, if the driver physiology shows stress during a telephone conversation with a certain number, such number will be tagged and will be treated as a source of high risk and will be blocked during unusually risky conditions so a driver does not engage in additional cognitive hungry activities. Additionally, if a driver uses telematics device A more often the C which is used more often then B, the access to such devices will be based on the mostly used first. In this case, A is followed by C and C is followed by B. Similar frequency based access priorities are applied to function of such telematics and also prioritized based on time, geography etc.

Other preferences set by the driver can include emergency contacts, medical record summary or identification, etc. to be used along with telemetry data when automatically reporting an accident via text to speech and via e-mail. This will help emergency dispatch understand and prepare the correct type of help needed, e.g. number of passengers, fire in cabin, impact speed, driver physiology and the driving telemetry before and during the impact. The trigger for an accident occurred reporting is preferably by one or more of the following signals: Distance and/or time from speed to zero is smaller than expected (taking into account weather, service monitor, vehicle capabilities, etc.), G-force too high for normal maneuvers, staling after hard breaking, airbag deployment, rollover indication, fire/smoke detected in vehicle.

The decisions to block, enable etc are accomplished by algorithms that share the hosts of signals provided to monitor for specific conditions that are encountered. These algorithms also update the driver profile to include skills and habits for further relaxing or restricting telematics. For example, a driver that drives frequently on expressways and in close proximity to other vehicles will be allowed more leeway then a person that hardly drives on the expressway. Similar monitoring occurs for nighttime driving, adverse weather driving and so on.

In one preferred implementation, as shown in FIG. **5**, the system monitors and analyzes a plurality of factors that can affect the safe travel of the vehicle, either alone or in combination with one or more other factors. Such factors relate generally to the vehicle, the driver, and the environment. The driver has various communication factors, physiological factors, and preferences/habits, skills and historical factors. The vehicle has instantaneous operational factors, and base and historical factors both associated and independent of a driver. The environment includes the interior vehicle environment, the exterior environment, geographic location, and regulatory factors.

Representative examples of driver communications factors include signals and information communicated to the driver such as vehicle warning indicators like low windshield washer fluid, low battery voltage, engine temperature, oil pressure, seat belt usage monitors, and the like. And further examples include input and output features of various devices communicated with the driver such as telephones, pagers, PDA'S, computers, fax machines, GPS devices, navigation systems and displays, radios, CD players, CB's, video monitors, and other telematic or informational devices. These devices can be termed communications devices since they permit or provide one-way or two-way communication with a driver of some information or signal. The devices can also be considered input/output devices since some permit or accept driver input and some permit or provide output to the driver. The term input/output devices is not intended to limit application to only devices having both an input and an output, any device permitting or providing either an input or an output, or both, may be used.

Representative examples of driver physiological factors have already been set forth, and include skin conductivity, pulse rate, blood pressure, blood oxygen level, grip pressure, alcohol sensed on driver's breath body temperature and the like. Other examples of driver physiological factors include driver seat position, seat belt usage, seat belt position (used in part to determine if driver is fully seated or leaning forward, etc), and driver position within the seat, driver seat reclining position and the steering member position such as tilt/telescoping adjustment. Drivers also have base and/or historical factors such as driver experience indicators (e.g. normal driving patterns, preferences, skill level, relevant training and safety record),

Representative examples of factors relating to the vehicle and its operation include whether the vehicle is in reverse, in park, accelerating, decelerating, traveling at high speed, negotiating a turn, swerving, making an extended length turn, turning at relatively high velocity, traveling without direction correction (one possible indication of a drowsy driver as noted previously), whether there is fire or smoke in the vehicle, and whether the engine has stalled (as may be indicated by movement of the vehicle without continuing engine operation), tire pressure, whether the vehicle has rolled-over or been inverted, is climbing or descending a hill, if the airbags have deployed, and if the ABS, traction control, or stability systems have been activated. Base or historical vehicle factors include whether the vehicle has driver assistance systems like ABS, adaptive cruise control, traction control, ESP/stability or other electronic steering assist, four-wheel drive, all-wheel drive and the like, as well as historical data indicative of service condition, tire wear, brake wear, and habits/skills of the driver within said vehicle, driving application (e.g. recognizing difference in usage between a family sedan and a police cruiser), minimum braking distance, maintenance history.

Representative examples of environmental factors include exterior conditions such as weather (rain, snow, bright sunshine, etc), time of day (e.g. night or day), road conditions

(e.g. wet, icy, etc), proximity to other vehicles, proximity to known obstacles, and the like. Further representative examples of environmental factors preferably also include interior conditions such as loud noises like a crying baby or barking dog, and the presence of cigarette smoke in the vehicle which can be an irritant to at least some drivers.

Representative examples of regulatory factors include speed limits, traffic signals, and specified rules for certain roads and the like.

The factors are monitored and compared to set or determined thresholds to determine the level of driver attention required to safely control the vehicle. The system controls all machine to man communications (e.g. phone, vehicle alarms/indicators, computer, PDA, etc) to and from the driver as a function of the monitored factors that provide an indication of the level of attention required by the driver to safely operate and control the vehicle. Conditions and factors that require a higher level of driver attention cause the system to permit less or no communication to and from the driver. This reduces driver distraction and frees the driver's senses so that they may be employed to ensure safe vehicle operation. The factors and conditions are assessed, rated and/or compared to threshold values. A single factor over a threshold value may be sufficient to cause the system to restrict, suppress or disable communications to and from the driver. Also, several factors, even if no single factor is over its threshold value, can cause the system to restrict communications to and from the driver. In other words, the relative severity of a combination of individual conditions encountered by the driver can cause an aggregate value over a threshold wherein further driver distraction is not desirable, so the system prevents communications to and from the driver in such situations. For example, the presence of water on the driving surface may not by itself be enough to cause the computer to restrict communications to and from the driver, but wet roads in combination with another condition like unusual driver physiological symptoms indicating increased driver stress, may be enough to cause the system to restrict or prevent communications with the driver. In this manner, the factors and conditions signals can be considered to be rated or valued with the ratings and values weighted and combined, or otherwise statistically rendered to provide an overall assessment of the driving conditions. Further, certain of the factors can be made dependent on other factors. For example, without limitation, the presence of water or ice on the road may be used to alter the threshold value or level relating to proximity to other vehicles since an increased stopping distance may be required when driving in such road conditions. Such diminished road conditions can also lower the acceptable speed or acceleration parameters.

Certain of the thresholds may be set or predetermined prior to installation of the system, and other thresholds may be learned or determined through use of the system in accordance with driver experience, history, preferences, as well as vehicle features, information and history. For example, one vehicle may be able to stop faster than another, so the threshold for the proximity to other vehicles can be different between the vehicles as the one vehicle can travel closer to other vehicles and safely stop in an emergency. Likewise, a driver that frequently travels on expressways at relatively high speeds in relatively close proximity to other vehicles may be permitted more leeway for communications in such conditions than a driver that rarely or never travels in that manner. Likewise, a driver that frequents a certain geographic region may be given more leeway for communications in that region than a driver outside of his normal driving region since that driver may be distracted trying to navigate in unknown regions. Likewise, drivers in vehicles with ABS, or other advanced safety features may be permitted greater leeway in communications that drivers in vehicles without such features in situations and conditions where these features improve the vehicle response and safety. Accordingly, the thresholds for individual driving factors and conditions, or combinations of factors and conditions, can be customized based on the driver and the vehicle. If desired, the driver profile can be continually updated based on feedback obtained as to the driver's driving habits, and such profile updates can be made based on real-time data, or statistical analysis.

Additionally, the various communications or inputs/outputs to and from the devices in the vehicle may detract differently from the driver's attention and ability to safely control the vehicle. Making a phone call may involve searching a database of names and phone numbers, dialing numbers, using voice activation or other tasks, and may be more driver intensive than answering a phone call of being alerted of a vehicle fault (like low washer fluid, low fuel level, etc). The level of driver involvement and/or potential distraction from the various communications devices, both when initiated by the driver and when communicated to the driver (where appropriate), is another factor that can be assessed to determine the level and timing of any restriction of the driver communications. So under at least some conditions certain communications to and from the driver may be restricted or suppressed while others are permitted.

When the assessed risk to the driver and other vehicles and things, is borderline (i.e. higher than normal risk, but not severe), the system may provide recommendations to the driver as to how to overcome any communications restriction, if doing so will not cause undue driver distraction. For example, without limitation, if the vehicle is traveling too fast to safely receive an incoming or make an outgoing telephone call, the system may inform the driver (either audibly or visually) to slow down to enable the telephone. Hence, the driver is permitted access to the communications if corrective action is taken (avoiding swerving, slowing down, driving within speed limit, increasing distance between adjacent vehicles, etc). Similarly, a time-delay may be initiated after certain conditions are sensed, like unusually rapid braking, or swerving, or the like to prevent immediate inputs to or outputs from the device as soon as the vehicle and driver factors are within allowable limits. This time-delay permits the driver to regain composure and assess the current situation prior to use of or interruption from the various input/output devices.

The system preferably permits significant customization by the driver. The driver can preferably select the type of feedback provided by the system (audible, visual, tactile, etc), and when the feedback is provided (e.g. not during telephone calls, etc). The driver can also preferably customize the voice used in any voice feedback, or the tones, tactile response, or visual display, if any. This customization helps to reduce distraction or annoyance caused to the driver by the system feedback, and thereby helps to maintain driver concentration and awareness of the vehicle and the environment.

The system preferably also provides a cross-check of at least some sensed conditions, such as vehicle operational conditions, to ensure that individually but related conditions are in agreement. For example, the system may compare sensed RPM or engine rotational speed with the throttle or velocity sensor and transmission sensor to ensure the sensed vehicle operating characteristics are all in agreement. If they are not, it could indicate a vehicle fault (e.g. slippage of the transmission or the tires on the road) and the system applies a more stringent restriction of the input/output devices as appropriate. The control system can be disabled by the user, but preferably, to do so requires the user to activate some

signal viewable by others that indicates the vehicle is operating out of normal constraints. One readily available mechanism that satisfies the above is the emergency or hazard lights provided on most vehicles and operable to cause several exterior lights to repeatedly flash indicating vehicle distress. Accordingly, in some implementations, the control system may be overridden by activating the vehicle emergency lights.

The system preferably includes a learning mode wherein certain routine or unusual events, conditions, locations, phone numbers and the like are stored for later access. In the learning mode the microprocessor or other controller may accept an input from a driver to store an address of a particular location, or may inquire if the driver wants the address stored wherein the driver may respond no or yes by activating the toggle switches on the steering member. The address can be stored as a function of its geographic location (latitude/longitude) for later access to, for example, facilitate finding that location at a later date, perhaps with the assistance of a navigation system. The learning mode could also be used to call out other features the driver may want to be reminded or warned of in the future, such as school zones, railroad crossings, changing speed limits, etc. The system could prompt or notify the driver when the vehicle is approaching such stored features as a function of the vehicle heading and geographic location. The learning mode provides increased customization ability to the driver, and can help build the driver's profile/driving habits and characteristics. The learning mode can be activated and deactivated by the driver, and may be preset for automatic use upon initial use of the system and for a certain time thereafter, subject to the ability of the driver to manually override such setting.

The system preferably also has a training mode wherein the system provides increased assistance to a driver to familiarize the driver with usage and various characteristics and features of the system. In training mode, the system may assist driver selection of applications by instructing or notifying the driver of the manner by which applications can be selected, as well as choices within an application. Training mode may also provide increased feedback of the reasons for suppression of any input/output device, and perhaps, ways to avoid such suppression (reduce vehicle speed, avoid harsh accelerations, etc). The training mode can be activated and deactivated by the driver, and may be preset for automatic use upon initial use of the system and for a certain time thereafter, subject to the ability of the driver to manually override such setting.

Predictive algorithms can be used to determine certain driving conditions based on driver habits and history, as well as data from research, or other drivers and the like. For example, the vehicle may perform certain maneuvers prior to exiting from a freeway to an off-ramp, or entering a freeway from an on-ramp. The vehicle may decelerate and gradually turn onto an off-ramp, and then further decelerate and negotiate a sharp turn on the off-ramp, or perform some other maneuvers from which the system can predict that the driver is exiting a freeway. From this prediction, the system may increase the restriction of telematics or other communications with the driver. Similar predictive behaviors or maneuvers may be detected for entering a freeway, and the system may likewise increase restrictions of communications.

Therefore, in at least one presently preferred embodiment of the safety control system for vehicles, the system includes a communication device having at least one of an input accessible from within the vehicle and an output communicated within the vehicle, at least one sensor operable to sense at least one condition related to vehicle operation, and a controller communicated with the sensor and the communication device to selectively suppress at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold. The communication device can be at least any of those previously mentioned herein, for example without limitation, a telephone, PDA, computer, vehicle alarm or indicator, navigation system, DVD player/recorder, CD player/recorder, and other electronic and/or telematic or other input/output devices accessible by the driver, and/or providing information or some communication to the driver. The sensors can also be at least any of those previously mentioned herein, for example without limitation, the physiological sensors, safety switches, toggle switches, vehicle operational sensors (e.g. steering, acceleration, deceleration, etc). And the controller can be at least any of those previously mentioned, for example without limitation, a stand alone unit with built-in microprocessor, an existing vehicle processor or control unit, and the like, and can be arranged to communicate with the driver and/or other devices as set forth herein.

While it will be appreciated, therefore, that while the invention has been described with respect to one preferred embodiment, many other variations, modifications and applications of the invention may be made. For example, without limitation, while the preferred embodiment requires the driver to maintain both hands on the steering wheel to initiate, receive and maintain communications or system access, other schemes may be used. For example, the system may require presence of two hands on the steering wheel to initially activate the system, and perhaps provide initial input (e.g. to place a telephone call and the like), but after such activation or initial input, the system may permit one hand to be removed from the steering wheel. This would facilitate, among other things, shifting a manual transmission. Shifting a manual transmission can be accommodated in the scheme requiring both hands on the steering wheel by permitting one hand to leave the steering wheel when the clutch is sensed as being activated to shift gears. Of course, other modifications, substitutions and applications can be accomplished in view of this disclosure.

The invention claimed is:

1. A safety control system for vehicles, including:

a communication device having at least one of an input accessible from within the vehicle and at least one output communicated within the vehicle;

at least one sensor operable to sense at least one condition related to vehicle operation; and

a controller communicated with the sensor and the communication device, the controller prevents said at least one output from being provided to the driver in the original format of said at least one output and provides said at least one output to the driver in a different format, and wherein the controller controls when at least one input and at least one output are provided to the driver so that prior to permitting the driver to access said input or prior to providing an output from the communication device to the driver, the controller determines whether said at least one condition is within a threshold and permits the driver to access said input or provides said output to said driver only when said at least one condition is within the threshold.

2. The system of claim **1** wherein said communication device includes at least one of a telephone, a pager, vehicle indicator providing an audible, text to speech, or visual output, a telematic device with an acceleration sensor, a computer, a display monitor, a GPS system, a navigation system, audio equipment, video equipment, voice recorder, wireless

device permitting access to internet, WAN or LAN network server, email, SMS and text messaging, digital address book, and a digital calendar.

3. The system of claim **2** wherein said communication device is portable and may be communicated with the controller by a USB connection.

4. The system of claim **2** wherein the communication device includes a calendar program and wherein controller is responsive to data or programmed commands of the calendar program to adjust the threshold as a function of said data or programmed commands.

5. The system of claim **2** wherein the communication device is in the vehicle associated with the communication device or in at least one other vehicle, or associated with at least one pedestrian.

6. The system of claim **1** wherein said controller includes at least one microprocessor having at least one input in communication with the sensor and at least one output in communication with the communication device.

7. The system of claim **6** wherein said at least one output of the microprocessor is communicated with the communication device to control an output of the communication device during certain vehicle operational conditions or driver physiological conditions.

8. The system of claim **6** wherein the microprocessor is part of an existing vehicle system.

9. The system of claim **1** wherein the controller is a stand alone device.

10. The system of claim **9** wherein the controller is a phone.

11. The system of claim **1** wherein said controller prevents an attempted input or output in response to a sensed parameter of said at least one condition being outside of a threshold and is operable to permit access to a said input or communication of a said output from the communication device after said sensed condition that caused prevention of the attempted input or output is again sensed to be within the threshold limit.

12. The system of claim **11** wherein the controller delays access to a prevented input or communication of a prevented output from the communication device for a predetermined period after the sensed condition is again sensed to be within the threshold limit.

13. The system of claim **11** wherein said controller enables an output detectable by the driver of the vehicle, and said output provides information to the driver as to a driving modification that can be made to re-enable the suppressed input or output.

14. The system of claim **1** wherein said at least one sensor includes a plurality of sensors that sense a plurality of operating conditions and said controller includes one or more controllers that assess the sensed conditions as a function of thresholds for individual sensed conditions and as a function of at least one threshold for a combination of two or more sensed conditions, said one or more controllers being operable to control at least one input or output of the communication device in response to assessed conditions at or outside of said thresholds.

15. The system of claim **14** wherein said at least one threshold for a combination of two or more sensed conditions is set at a level that can be exceeded without any of said two or more sensed conditions being above its individual threshold.

16. The system of claim **15** wherein the two or more sensed conditions are independent of each other.

17. The system of claim **15** wherein the two or more sensed conditions occur at different times.

18. The system of claim **1** wherein said at least one sensor is operable to determine at least one of instantaneous acceleration or velocity of the vehicle.

19. The system of claim **18** wherein the controller is responsive to vehicle acceleration indicative that the vehicle has been involved in an accident to provide an output detectable from outside of the vehicle to indicate that the vehicle has been in an accident.

20. The system of claim **19** wherein said communication device is a phone and said output includes placing a call from said phone.

21. The system of claim **20** wherein said phone is a portable phone.

22. The system of claim **20** wherein the phone is in the possession of the person controlling the vehicle.

23. The system of claim **19** wherein, in addition to the output detectable from outside of the vehicle to indicate that the vehicle has been in an accident a verbal or visual countdown within the vehicle before providing said output.

24. The system of claim **23** wherein said output detectable from outside of the vehicle to indicate that the vehicle has been in an accident may be aborted by the person controlling the vehicle before the output is provided.

25. The system of claim **1** wherein said at least one sensor is operable to determine at least one physiological condition of a driver of the vehicle.

26. The system of claim **25** wherein the physiological condition includes intoxication of the driver.

27. The system of claim **26** wherein the controller is responsive to the intoxication of the driver to provide an output indicative that the driver is intoxicated.

28. The system of claim **27** wherein the output indicative that the driver is intoxicated includes activating the vehicle emergency lights, limiting vehicle speed, or sending a message indicative that the driver is intoxicated, where the message may be sent via a phone, LAN, WAN, or internet.

29. The system of claim **1** wherein the controller is communicated with data specific to a vehicle being used and said threshold is determined based at least in part on data specific to the vehicle being used so that the threshold is different for different types of vehicles.

30. The system of claim **1** wherein the controller is communicated with data specific to a person controlling the vehicle and said threshold is determined based at least in part on data specific to the person controlling the vehicle so that the threshold is different for different people.

31. The system of claim **30** wherein said data specific to the person controlling the vehicle includes data provided by said person.

32. The system of claim **30** wherein said data specific to the person controlling the vehicle includes data provided by said controller in response to historical information specific to said person.

33. The system of claim **30** wherein the controller compares said data specific to a person controlling the vehicle with data from said sensor to determine if said data specific to a person controlling the vehicle relates to the person actually controlling the vehicle.

34. The system of claim **33** wherein said controller is operable to prevent access to at least one of the vehicle or communication device if said data specific to a person controlling the vehicle does not sufficiently relate to the person actually controlling the vehicle.

35. The system of claim **33** wherein said data specific to a person controlling the vehicle includes at least one of seat position, mirror position or weight, and said sensor is responsive to at least the same one of seat position, steering wheel position, mirror position or weight to provide to the controller data of person currently controlling the vehicle so that the

controller can compare that data with stored data specific to the person controlling the vehicle.

36. The system of claim **30** wherein when the vehicle is not operating the data specific to the person controlling the vehicle is removed from the controller.

37. The system of claim **30** wherein when the vehicle is not operating the data specific to the person controlling the vehicle is uploaded to the communications device and removed from the controller.

38. The system of claim **30** wherein said data includes computer programs.

39. The system of claim **30** wherein the data specific to a person controlling the vehicle includes a profile of at least one of driver physiology, preferences, settings or habits.

40. The system of claim **30** wherein the data is synchronized and stored remotely from the vehicle, locally, or in a format accessible by a portable communications device.

41. The system of claim **30** wherein the data specific to a person controlling the vehicle and data related to the vehicle operation and geographic location are made accessible to another party with authorization by or permission of the vehicle owner.

42. The system of claim **30** wherein the data specific to a person controlling the vehicle includes medical data or data related to the health of the driver.

43. The system of claim **1** wherein the controller suppresses at least one of said input and said output in response to a sensed parameter of said at least one condition being outside of a threshold.

44. The system of claim **1** wherein the controller includes an output to provide to a driver of the vehicle an indication of the sensed parameter causing the prevention of said at least one of said input and said output.

45. The system of claim **1** wherein the controller activates an output to provide a signal visibly detectable outside of the vehicle in response to a sensed parameter of said at least one condition being outside of a threshold.

46. The system of claim **45** wherein the output is detectable within the vehicle when said output relates to safety of the vehicle with the controller and the output is detectable outside the vehicle when the output relates to safety of other vehicles.

47. The system of claim **1** wherein the controller activates an output to provide a visible, tactile or data signal detectable in at least one of within the vehicle or outside of the vehicle in response to a sensed parameter of said at least one condition being outside of a threshold.

48. The system of claim **1** wherein the threshold is adjustable by the controller.

49. The system of claim **48** wherein the controller is responsive to adjust the threshold as a function of at least one of driving purpose factors, driving application factors, proximity to other vehicles, communication factors, physiological factors, temporal factors, preferences, habits, skills or historical factors specific to a person controlling a vehicle.

50. The system of claim **49** wherein the controller is responsive to adjust the threshold as a function of at least one of instantaneous operational factors, base factors, temporal factors or historical factors relating to the vehicle.

51. The system of claim **50** wherein said at least one of instantaneous operational factors, base factors, temporal factors or historical factors relating to the vehicle are independent of the person controlling the vehicle.

52. The system of claim **50** wherein said at least one of instantaneous operational factors, base factors, temporal factors or historical factors relating to the vehicle are associated with the person controlling the vehicle.

53. The system of claim **52** wherein said at least one of instantaneous operational factors, base factors, temporal factors or historical factors relating to the vehicle are associated with a person other than the person controlling the vehicle.

54. The system of claim **49** wherein the controller is responsive to adjust the threshold as a function of at least one of interior vehicle environment, the exterior environment, geographic location of the vehicle, temporal factors or regulatory factors.

55. The system of claim **54** wherein the geographic location of the vehicle includes information relating to at least one of traffic lights, railroad crossings, school zones, road twists and turns, and stop signs.

56. The system of claim **55** wherein the controller controls the output of a communication device when the vehicle is approaching or in one of said geographic locations to provide a signal to the driver of the vehicle indicative of said geographic location.

57. The system of claim **1** wherein the input is a sensor manually operable by an occupant of the vehicle, or a function to be manually set by an operator of the vehicle, to permit the occupant to selectively accept or reject an output from said communications device.

58. The system of claim **1** which also includes a portable device capable of storing data related to at least one of communication factors, physiological factors, temporal factors, regulatory factors, preferences, software applications, webpages addresses, maximum allowed driving speed, standard acknowledgment, emergency vehicles siren or lights, emergency information for the driver, seat belt usage, privacy settings to prevent data access by others, allowable telematic activity, habits, skills or historical factors specific to a person controlling a vehicle and wherein the controller is responsive to the data stored on the portable device to determine said threshold at least in part as a function of said data.

59. The system of claim **58** wherein said device is portable and selectively communicated with the controller.

60. The system of claim **58** wherein the device includes or is defined primarily by flash memory.

61. The system of claim **1** which also includes a telematics device capable of storing data related to at least one of instantaneous operational factors, base factors, temporal factors, regulatory factors, or historical factors relating to a vehicle with which the controller is used and wherein the controller is responsive to the data stored on the telematics device to determine said threshold at least in part as a function of said data.

62. The system of claim **1** which also includes a telematics device capable of storing data related to at least one of interior vehicle environment, the exterior environment, geographic location of the vehicle, infrastructure, signs, temporal factors or regulatory factors and wherein the controller is responsive to the data stored on the telematics device to determine said threshold at least in part as a function of said data.

63. The system of claim **1** wherein when the controller controls an output the output is changed to a different output.

64. The system of claim **1** wherein when the controller controls an output the controller delays the output.

65. The system of claim **1** wherein the controller includes an output and the controller is responsive to the duration of use of an input or output of the communication device and when said duration is beyond a threshold the controller output is operable to provide a signal detectable within the vehicle by the driver.

66. The system of claim **65** wherein the controller includes an input responsive to a driver action and said controller

output provides said signal until the driver provides an action to which the controller input is responsive.

67. The system of claim **1** which includes a source of data related to at least one of factors relating to a person driving a vehicle, factors relating to the vehicle being driven, regulatory factors, or factors relating to the environment in which the vehicle is driven and said controller is responsive to said data to determine the threshold at least in part as a function of the data.

68. The system of claim **67** wherein said source is remote from said controller.

69. The system of claim **67** wherein the data is synchronized and stored on a LAN, a WAN, the internet, or a portable telematic device.

70. The system of claim **1** wherein the sensor is responsive to the presence of an item of food on a tray in the vehicle.

71. The system of claim **1** which also includes a second sensor which may be actuated from a first state to a second state and wherein the controller is responsive to a sensed condition outside of a threshold and indicative of an emergency to selectively provide an output indicative of the emergency after the driver changes the states of the second sensor.

72. The system of claim **1** wherein said at least one sensor is responsive to two conditions which are related to each other so that data from said at least one sensor for one of said two conditions can be at checked for agreement with data from said at least one sensor for the other of said two conditions so that the controller can prevent erroneous data from said at least one sensor as to said one condition from affecting the threshold.

73. The system of claim **1** wherein the controller is part of multiple existing vehicle systems.

74. The system of claim **1** wherein said threshold includes a table of thresholds communicated with the controller.

75. The system of claim **1** wherein said controller is a plug and play device that docks with the vehicle physically or wirelessly.

76. The system of claim **75** wherein said controller docks with portable telematic devices physically or wirelessly.

77. The system of claim **76** wherein the portable telematic device docks via a USB connection or a wireless connection protocol.

78. The system of claim **75** wherein the controller docks with the vehicle via a USB connection or a wireless connection protocol.

79. The system of claim **1** wherein the sensor is responsive to a driver initiated action.

80. The system of claim **1** wherein the sensor is responsive to at least one of driver seat, sun visor, mirrors or vehicle accessory activation by the vehicle driver.

81. The system of claim **1** wherein the sensor is responsive to at least one of driver door controls, turn signal lamp and control, headlamps and control, fog lamps and control, gear shifter, pedals, and steering activation by the driver.

82. The system of claim **81** wherein the threshold is set as a function of the rate of change of the throttle pedal position or the rate of change of the brake pedal position.

83. The system of claim **82** wherein the sensor is responsive to a low rate of change or a high rate of change of the throttle or brake pedal positions and the threshold may be set as a function of at least one of the low rate of change or the high rate of change of the throttle or brake pedal positions.

84. The system of claim **1** wherein the vehicle includes a plurality of accessories and said controller is operable to actuate such accessories in response to at least one of instantaneous operational factors, base factors, driver physiology, driver actions, the exterior environment, geographical location of the vehicle heading and bearing of the vehicle, temporal factors or regulatory factors relating to a vehicle with which the controller is used and wherein the controller is responsive to determine said threshold at least in part as a function of said data.

85. The system of claim **84** wherein the accessories are at least one of a sun visor, a turn signal indicator, HVAC, or rear view mirrors.

86. The system of claim **84** wherein the vehicle includes at least one rear view mirror that enables viewing areas outside of the vehicle and when an object is in a blind spot of the vehicle mirror or in the generally intended direction of travel, said controller is operable to move the mirror and change the field of view of the mirror exposing the object or the generally intended direction of travel to the driver from the normal driving position.

87. The system of claim **84** wherein the vehicle includes a power sunvisor and said controller is operable to deploy the sun visor when the vehicle heading, location, time of day, day of year and driver height indicate that the driver is heading into the sun.

88. The system of claim **84** wherein the controller controls HVAC operation in response to at least one of driver preferences, environmental factors, the location, altitude and heading of the vehicle, or the temperature of a vehicle occupant.

89. The system of claim **1** wherein the controller is responsive to a signal received by the communications device to adjust the threshold as a function of the source or content of the signal.

90. The system of claim **89** wherein the source or content of the incoming signal is identifiable from information in the signal.

91. The system of claim **90** wherein the signal is a telephone based signal.

92. The system of claim **90** wherein the signal is an e-mail or text based signal.

93. The system of claim **90** wherein the signal is an internet based signal and the source of the signal is identifiable by its URL.

94. The system of claim **90** wherein the signal contains information that is to be visually displayed.

95. The system of claim **89** wherein the threshold is determined as a function of the legality of the content of the signal or as a function of at least one predetermined preference of the driver.

96. The system of claim **1** wherein the controller includes a controller located remotely from the vehicle and wirelessly communicated with the vehicle.

97. The system of claim **1** wherein the sensor is responsive to at least one condition indicative that the vehicle has been in an accident and wherein the controller is responsive to such a sensed condition to provide an output detectable from outside the vehicle.

98. The system of claim **97** wherein the output includes an email, text-to-speech communication or information uploaded to a WAN, LAN or the internet.

99. The system of claim **97** wherein said condition indicative that the vehicle has been in an accident includes a stopping distance of the vehicle from speed to zero is smaller than expected, the time of the vehicle to stop from speed to zero is smaller than expected, a G-force that is too high for normal maneuvers, vehicle staling after hard breaking, airbag deployment, rollover indication, or smoke detected in vehicle.

100. The system of claim **97** wherein the output includes data related to location of the vehicle or vehicle occupants.

101. The system of claim **1** wherein the controller is responsive to adjust the threshold as a function of at least one of interior vehicle environment, the exterior environment, geographic location of the vehicle, temporal factors or regulatory factors.

102. The system of claim **101** wherein the geographic location of the vehicle includes information relating to at least one of traffic lights, railroad crossings, school zones, road twists and turns, and stop signs.

103. The system of claim **102** wherein the controller controls the output of a communication device when the vehicle is approaching or in one of said geographic locations to provide a signal to the driver of the vehicle indicative of said geographic location.

104. The system of claim **1** wherein the controller is able to communicate with a LAN, WAN, cellular network, cellular device or via Data Burst, to permit uploading data, software or other information from the controller or downloading data, software or other information to the controller, or to update an operating system or add new applications.

105. The system of claim **1** wherein said at least one sensor includes a smoke detector operable to sense the presence of smoke.

106. The system of claim **105** wherein, when a threshold level of smoke is sensed by the smoke detector, the controller will activate a signal detectable inside or outside the vehicle via a communication device.

107. The system of claim **1** wherein said at least one sensor is operable to detect the state of a traffic light, wherein the state of the traffic light is whether the traffic light is displaying a green or red signal.

108. The system of claim **107** wherein said at least one sensor is operable to sense a red light of a traffic light.

109. The system of claim **1** wherein the controller transmits data related to vehicle operation in real time to either the communication device, LAN, WAN or internet.

110. The system of claim **1** wherein the communication device transmits or receives data related to vehicle operation in real time to either the communication device, LAN, WAN or internet.

111. The system of claim **1** wherein the threshold is determined as a function of the driver distraction associated with accessing and using said at least one input or being provided an output from the communication device, so that a lower threshold is provided for said sensed condition with regard to an input or output having a higher level of driver distraction.

112. The system of claim **111** wherein said communication device is docked with said controller either physically or wirelessly, and wherein said controller suppresses at least one of said input and said output when said communication device is docked with said controller, and permits access to or use of said input or output only when said sensed condition is within the threshold associated with said input or said output.

113. The system of claim **1** wherein the controller also prevents continued driver access of an input when the threshold is exceeded during driver use of the input, and the controller also prevents an output of the communication device from being communicated to the driver after the threshold is exceeded during an already initiated output from the communication device.

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CERTIFICATE OF COMPLIANCE

This brief complies with the type-volume limitation of Federal Rule of Appellate Procedure 32(a) and Federal Circuit Rule 32(a). This brief contains under 14,000 words, excluding the parts of the brief exempted by Federal Rule of Appellate Procedure 32(f) and Federal Circuit Rule 32(b).

This brief complies with the typeface requirements of Federal Rule of Appellate Procedure 32(a)(5) and the type style requirements of Federal Rule of Appellate Procedure 32(a)(6). The brief has been prepared in a proportionally spaced typeface using Microsoft Word 2016 in 14-point Times New Roman.

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